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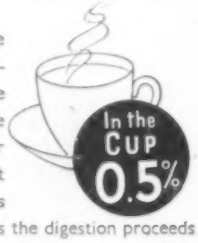

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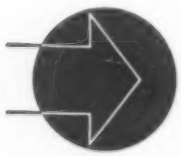

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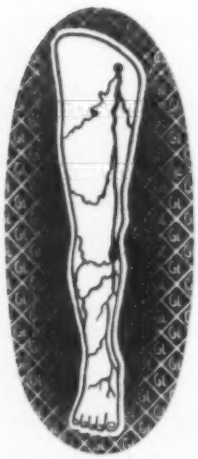

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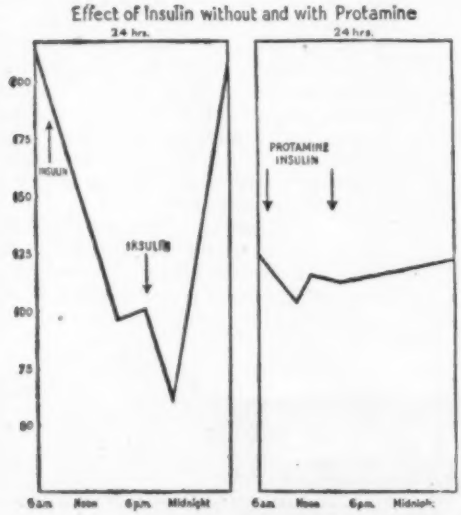

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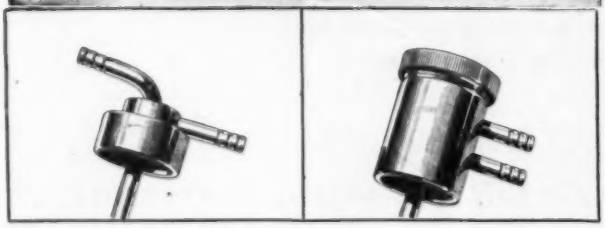

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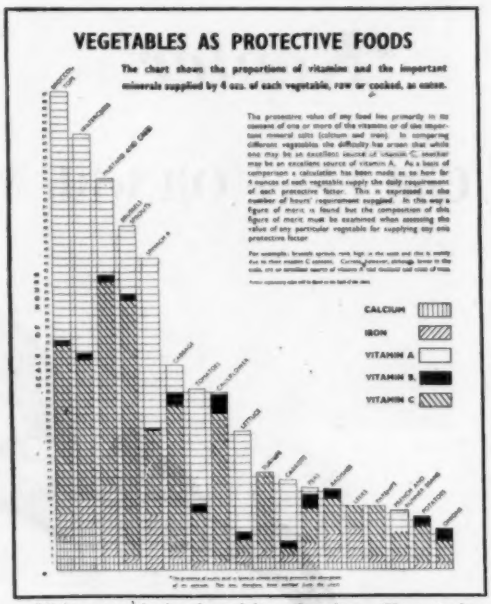
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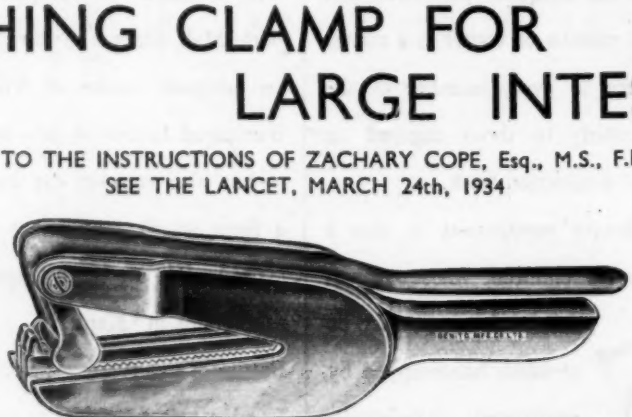

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18

ORIGINAL ARTICLES

HÆMOGLOBIN METABOLISM

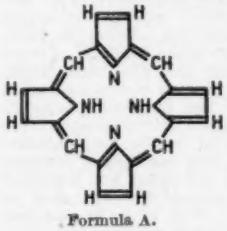
M. C. G. ISRAËLS, M.D., M.SC. MANC., M.R.C.P.
ASSISTANT DIRECTOR OF THE DEPARTMENT OF CLINICAL INVESTIGATION AND RESEARCH, UNIVERSITY AND ROYAL INFIRMARY, MANCHESTER

WHEN Hans Fischer began the study of the pigments excreted in the rare condition of congenital porphyria, it could hardly have been foreseen that the extension of this work would lead to a more thorough understanding of the metabolism of respiratory pigments in general, including hæmoglobin. Such investigations are difficult, and although Fischer and his co-workers synthesised hæmin in 1929 much further chemical groundwork has been needed before the results could be applied to the clinical problems of blood-diseases.

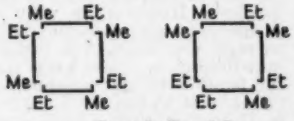
Hæmoglobin is formed by linking together a protein—globin—with an iron-containing pigment "protohæm." This protohæm is a combination of ferrous iron with a substance "protoporphyrin" which is closely allied to the pigments excreted in congenital porphyria. Fischer and his school have shown that all the naturally occurring porphyrins are variations on one theme—the "porphin" nucleus which is made up of four pyrrol rings joined by methene bridges (formula A). When the eight H atoms on the bases of the pyrrol rings are replaced by four methyl (Me) and four ethyl (Et) groups an artificial compound called "ætioporphyrin" is obtained. There are four possible isomeric ætioporphyrins, but the naturally occurring porphyrins all correspond to series I (formula B) or series III (formula C). There is no simple chemical way whereby series I compounds can derive from series III or vice versa; breakdown of the porphin nucleus and resynthesis would be needed and this is thought to be a very unlikely occurrence. The different porphyrins have different side-chains replacing the eight H atoms in porphin. Thus protoporphyrin has four—one CH_3, two $CH=CH_2$, and two CH_2-CH_2-COOH groups. Coproporphyrin, the normal excretion form, has four CH_3, and four CH_2-CH_2-COOH groups; uroporphyrin, with four CH_2-COOH and four CH_2-CH_2-COOH groups appears only in the porphyrias. Now the protoporphyrin of hæmoglobin belongs to series III, and Watson[1] showed that the free protoporphyrin in reticulocytes is also series III. Normal people excrete small amounts of coproporphyrin, about two-thirds in the fæces and a third in the urine; but all the fæcal and at least half the urinary coproporphyrin is series I and cannot therefore have been derived from the breakdown of hæmoglobin. Patients with hæmolytic anæmia known to be destroying large numbers of erythrocytes excrete relatively large quantities of coproporphyrin, but surprisingly this again is all series I. This unexpected finding that the excreted porphyrin is a different isomer and is therefore not derivable from the hæmoglobin porphyrin was called by Fischer the "dualism of the porphyrins" and has to be taken into account in any study of porphyrin excretion designed to throw light on hæmoglobin metabolism. It is not sufficient to know how much porphyrin is excreted—we must know to which series it belongs, and indeed Watson thinks it more important to know which than how much. Unfortunately the determination of the isomeric type is far from simple; it demands [2] the separation of the porphyrins, the preparation of their methyl esters and the determination of melting-points; and since the amounts excreted daily are measured in microgrammes, or only occasionally in milligrammes, skilled chemical technique is essential. For these reasons little data is at present available, but what there is is important.

In pernicious anæmia [3] there is greatly increased excretion of coproporphyrin I. When specific liver treatment is given the porphyrin excretion continues raised until after the reticulocyte peak is passed; then it slowly falls to normal. Coproporphyrin I is also excreted in large amounts in hæmolytic anæmia and in the period of blood-regeneration after hæmorrhage.[3] In aplastic anæmia,[4] on the other hand, from a fifth to a tenth of the excreted coproporphyrin is series III, and coproporphyrin III has also been found in poisoning by lead,[5] sulphanilamide [5] and other substances. Hence the excretion of coproporphyrin I seems to be linked with unusual erythropoietic activity, including the megaloblastic erythropoiesis of pernicious anæmia, but excretion of coproporphyrin III seems linked with depressed erythropoiesis. In the first group there is always evidence of excessive destruction of red cells, but as already pointed out the coproporphyrin I cannot have come from the red cells. Is the coproporphyrin III of the second group derived from hæmoglobin? Apparently not. Lemberg's [6] studies of hæmoglobin breakdown have revealed that porphyrins are not formed; the porphin nucleus opens while still attached to globin and iron and thereafter is converted into biliverdin and bilirubin; the excretion forms of bilirubin, urobilin and urobilinogen, are therefore used as indicators of hæmoglobin destruction.

Ingenious explanations of these contradictions have been suggested by Rimington,[7] Dobriner and Rhoads,[8] and Turner.[9] They all suppose that from a pyrrollic precursor porphyrins of series I and III are formed simultaneously, normally much more III than I, but if the production of III is increased I is increased proportionately. The series III porphyrin is protoporphyrin and is used in the formation of hæmoglobin, but



Formula A.



Formulæ B and C.

the series I porphyrin is apparently useless—it is converted into coproporphyrin and excreted. Hence if there is unusually rapid formation of red cells more porphyrin III is needed for hæmoglobin and a correspondingly increased amount of porphyrin I is formed and excreted. But in aplastic and toxic anæmias, owing either to the absence of erythroblasts or to toxic interference with hæmoglobin synthesis, the porphyrin III still being formed is unused and is excreted as coproporphyrin III. The changes in congenital and acute porphyrias are attributed to disturbance of this orderly synthesis. There is no real evidence in support of this theory but it fits the facts partly at least. Rimington and Hemmings [9] have shown that toxic drugs like sulphanilamide which cause methæmoglobin formation also cause increased porphyrin excretion, and this is coproporphyrin III. Hence they suggest that this may represent an alternative method of hæmoglobin breakdown, but occurring only when methæmoglobin is a phase in the cycle.

Clearly there is still room for much more evidence before confident interpretations are possible, but the type of problem these results can be applied to is illustrated by Vaughan and Saifl's [10] investigation into the cause of anæmia in chronic infection. The porphyrins excreted by their patients were estimated by Rimington who reported a rise in the excretion of both series I and III. Since there was no evidence of increased hæmoglobin breakdown it was concluded that a disturbance of hæmoglobin synthesis was responsible. In a previous paper,[11] by correlating cytological examination of the bone-marrow with clinical findings, I was able to divide erythropoietic disturbances into broad groups. Further subdivision of these groups may well come from biochemical studies of hæmoglobin metabolism which can detect the conditions in which hæmoglobin is insufficiently available for normal marrow cells. The difficulty of the biochemical methods involved still stands in the way of really systematic investigation of the anæmias from this point of view. As Watson has said, what we need is a differential method permitting estimation of the amount of each isomer present without recourse to actual isolation. Until this happy day comes we must proceed, where we can, with the determination of the porphyrin isomers appearing in the various anæmias so

that there will be sufficient data free from the bias of individual cases.

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LIGATION AND CHEMOTHERAPY FOR INFECTION OF PATENT DUCTUS ARTERIOSUS

GEOFFREY BOURNE, M.D. LOND., F.R.C.P.

KENNETH D. KEELE, M.D. LOND., M.R.C.P. — O. S. TUBBS, M.B. CAMB., F.R.C.S.

Note on the bacteriology by R. H. A. SWAIN, M.B. CAMB.

THE dangers of a patent ductus arteriosus lie in two main factors: the mechanical effect on the circulation and the local supervention of infection. Gross, in 1939, first ligated a patent ductus, since when some 20 or more cases have been reported. Gross and Hubbard (1939) considered that infection of the ductus contra-indicated ligation. However, in view of the hopeless prognosis in infected cases, operation combined with sulphapyridine therapy was considered justifiable in the two patients here described. Case 1 was the first example of successful ligation in the presence of infection yet reported (Keele and Tubbs 1940). The patient was operated on in December, 1939. Until April, 1941, when he was last heard of, he remained an active working citizen free from cardiovascular symptoms. Some hæmaturia from a coexistent nephritis persisted. The second patient was similarly treated by the sulphapyridine-operation technique in October, 1940, and remains well 11 months later.

CASE-HISTORIES

CASE 1.—Man, aged 23, admitted to St. Bartholomew's Hospital under care of one of us (K. D. K.) in October, 1939. Five months before had had febrile attack diagnosed as influenza, for which was kept in bed for 14 weeks, during which there was but slight improvement. Weakness and loss of weight (2 st.) progressed. Since this illness had never felt well. Periods of 1–3 weeks at work alternated with similar periods in bed. Recently dyspnœa on exertion had been noticed. No gross hæmaturia and no pain in chest or petechial rash had been observed. No previous illness, apart from "heart trouble" from birth; this had not prevented him from playing football and cycling.

Lightly-built pallid man (Hb. 45%). Small petechiæ over neck, shoulders and legs. Cardiac impulse heaving. Apex-beat 4½ in. from midline. Palpation over the pulmonary base revealed thrill extending through systole into early diastole. Loud "machinery" murmur heard all over præcordium, maximal in region of pulmonary base, occupying all systole and large part of diastole. Pulmonary second sound audible. Blood-pressure labile, varying from 110/60 to 150/80 mm. Hg with patient lying in bed. Liver and spleen palpable. A teleradiogram showed slight enlargement of heart and prominence of pulmonary conus region. Red cells 2,665,000 per c.mm.; Hb. 45%; white cells 11,300 (polymorphs 80%). Sedimentation-rate, 135 mm. in 1 hour. Urine contained much albumin, with positive guaiacum reaction; microscopy of centrifuged deposit showed many red cells, pus cells and few granular casts; culture grew *Streptococcus fæcalis* (once only). Blood-urea, 71 mg. per 100 c.cm. Blood-culture positive for *Hæmophilus influenzæ*.

Course.—High intermittent fever, uninfluenced by general medical treatment and blood-transfusions. After 2 weeks sulphapyridine begun in dosage of 3 g. daily for 3 days; then 1½ g. daily for 18 days until operation. This small dose produced vomiting and depression, but also dramatic subsidence of fever. General condition improved considerably, but blood-culture remained positive. In view of this it was decided, after 3 weeks' improvement, that he had a chance of surviving ligation of patent ductus, and this was carried out by O. S. T. on Dec. 5, 1939. At the moment of ligation, blood-pressure rose from 108/60 to 120/80 and murmur at pulmonary base diminished to short rough systolic murmur, which has since remained unchanged. Post-operative course complicated, as expected, by further impairment of renal function, and development of uræmia. Headache, vomiting and oliguria accompanied rapid rise in blood-pressure to a maximum of 180/120. Blood-urea at this time 218 mg. per 100 c.cm. and alkali reserve 36·6. Some œdema of neck and upper chest; subsided within 10 days.

After this anxious period steady improvement ensued. Sulphapyridine had not been given during this time, but nevertheless the blood-culture became negative and remained so for 3½ months. The hæmaturia diminished and the blood-pressure slowly fell. At the end of March, 1940 (3½ months), blood-culture became positive again and three courses of sulphapyridine, each totalling 30 g. in 10 days, were given, with a week's interval between each. Since the final course the patient has remained afebrile. In spite of this a further positive blood-culture was obtained in June, 1940. The patient was then up and had no symptoms, volunteering that he had "never felt better in his life." Blood-urea 42 mg. per 100 c.cm.; sedimentation-rate 110 mm. in 1 hour. Urine showed red cells and some granular casts; urea-clearance 40% of normal. Blood-culture was negative 2 months later and has remained so since (January, 1941). When last seen (April, 1941) felt well. During a short period at home permitted after 9 months in hospital, returned to work (against our advice) and got married. No change in cardiac signs. Short pulmonary systolic murmur persisted. Blood-pressure more stable at 110. Sedimentation-rate 60 mm. in 1 hour. Red cells 5,530,000; Hb. 122%; white cells 18,000 (polymorphs 59%). Blood-urea 44 mg. per 100 c.cm. Blood-culture negative after 10 days.

CASE 2.—A girl of 19 who had always known that there was something wrong with her heart. Remained in good health until 4 months before admission to hospital. During this time complained of headache, lassitude and undue sweating at night, and fever present more or less continuously. No peripheral or pulmonary embolic symptoms. On admission intermittent fever present, ranging up to 100° and 101° F. Apex-beat 1 in. to left of midclavicular line. Typical systolic murmur and thrill of patent ductus arteriosus present, persisting well into diastole and loudest in second left interspace near sternum. Blood-pressure 132/40. Blood-culture yielded, on three separate occasions, growth of *Strep. viridans* in all tubes, colony-count in shake-culture numbering at first about 300 per c.cm. Red cells 3,800,000; Hb. 62%; white cells 14,800.

Course.—After a week, 6 g. of sulphapyridine per day given for 4 days; then reduced to daily dose of 4½ g. for 12 days. Fever disappeared and blood-cultures became less profuse and then sterile. Afebrile period lasted 12 days until operation on Oct. 21, 1940. After ligation of ductus (O. S. T.) febrile reaction occurred lasting 3 days. Temperature occasionally touched 99° F. during subsequent 3 weeks; then kept normal for whole convalescent period. Sulphapyridine continued at daily dose of 4½ g. daily for 5 weeks, when reduced to 3 g. for 4 days, after which it was omitted. Put on a stone in weight in first month. Has remained well for 11 months (September, 1941). Sedimentation-rate then normal.

SURGICAL TECHNIQUE *

The technique employed in these two patients was almost exactly the same as that described in detail by Gross (1939, 1940) for cases uncomplicated by infection, so that a detailed description would be superfluous; the main steps in the operation will however be outlined since no similar cases have yet been reported in the English journals.

Both patients received intravenous glucose-saline during the operation. The wisdom of this therapy is doubtful, since these people, like those with an arterio-venous aneurysm, have an increased blood-volume, and the sudden conversion of the circulation to that of the normal person therefore theoretically throws a temporarily increased burden on the heart; fluid put in artificially can only add to this increase. It is an insurance against

* The surgeon (O. S. T.) wishes to acknowledge that his interest in the subject was initiated by Strieder, who made the first attempt to ligate an infected patent ductus arteriosus (Graybiel, Strieder and Boyer 1938).

possible rapid hæmorrhage, however, but it should be stopped as soon as the ductus is successfully ligated.

Anæsthesia was by a nitrous-oxide, oxygen and ether mixture (Dr. C. L. Hewer and Dr. F. Evans) in case 1, and by cyclopropane and oxygen (Mr. B. Rait-Smith) in case 2. An endotracheal tube was used in case 1 but not in case 2. The ductus arteriosus was approached through the left pleural cavity, which was opened through the second left intercostal space, the skin incision extending from the midline in front to the anterior axillary line. The second and third costal cartilages were divided close to the sternum and excellent exposure obtained by separating the ribs with a rib-spreader. The internal mammary vessels were divided between ligatures so that full use of the medial end of the incision might be obtained. In case 2, the two layers of pleura were adherent around the medial half of the incision and on the mediastinum and required separation by blunt dissection; the adhesions apparently resulted from infarction of the lung which was firm and red in this region. In both patients, the grossly enlarged pulmonary conus was seen to distend abnormally during systole and a well-marked thrill was palpable. In the first patient, the region of the ductus arteriosus was exposed by continuing the intercostal pleural incision on to the mediastinum, but it was found that the phrenic nerve and its accompanying vessels prevented adequate working room and had to be divided. This was obviously an error in technique and was corrected in the second case by incising the mediastinal pleura parallel with, and posterior to, the phrenic nerve which was then retracted anteriorly. No difficulty was experienced in either case in identifying the patent ductus.

The cellular tissue under the arch of the aorta was gently swept from the anterior surface of the ductus with a pledget of gauze held in a long hæmostatic clamp. Keeping immediately against the wall of the ductus, the adjacent tissues were readily separated by blunt dissection except from the posteromedial surface where a plane of cleavage must be found without a direct view. This was done by insinuating the left index finger into the cleft between the aortic arch and the bifurcation of the pulmonary artery anterior to the ductus and passing a malleable blunt-ended aneurysm needle through the tissues behind the ductus, so as to impinge on the left index finger, finally bringing the eye into view anteriorly to receive the ligature material. This part of the dissection must obviously be carried out most gently, keeping close to the ductus. Contrary to the experience of Touroff and Vesell (1940a), in neither case was anything but trivial hæmorrhage encountered. Nevertheless, if infection is not of recent inception, the surgeon must be prepared to find the walls of the ductus thinned, friable and adherent, and possibly an associated mycotic aneurysmal dilatation—a danger which has been much stressed by American workers. The recurrent laryngeal nerve was not identified in either patient, but it was thought that damage would be avoided by always keeping the dissection against the wall of the ductus. It is probable that physiological conduction was interfered with temporarily in the first patient, for he was hoarse for several weeks after the operation, but full recovery was present by the sixth week, when the vocal cords were examined by Mr. Norman Jory. There was no interference with voice production in the second patient.

The ductus was about ½ in. in diameter in the first case and a little more than this in the second; in both, the length was approximately ¾ in. The idea of excising the ductus appears to be excellent in theory but totally impractical. Gross's comment that "the ductus has always been so short that I have not dared to divide it in any instance" applied in our two patients. Two doubled no. 5 tubular silk ligatures were used to occlude the ductus. A faint thrill could be palpated in the pulmonary conus after applying the first ligature in each case, but it was abolished by the second. Finally, the mediastinal pleura was sutured and the wound closed in layers. Gentle positive pressure was used by the anæsthetist during closure of the wound so that complete reinflation of the lung expelled all the air from the pleural cavity.

POINTS OF INTEREST

Physical signs after operation.—In case 1 the classical signs of patent ductus arteriosus changed after ligation to a short rough systolic murmur at the pulmonary base. The palpable thrill disappeared. No detectable change in the size of the heart was found, though after ligation the pulmonary conus and artery seemed to be less distended during systole, being deprived of the blood regurgitated through the patent ductus. After operation the blood-pressure rose from 120/80 to 180/120 and the blood-urea from 71 to 216 mg. per 100 c.cm., since when there has been progressive improvement in these features.

In case 2, before operation the typical systolic murmur carried on into diastole had been present. After ligation it persisted and remained for some weeks nearly as loud as before. After 7 months it had become much less loud, the diastolic part of the sound being now nearly inaudible. This curious fact was also noted by Touroff, who in one case cut the ductus between the two ligatures, thus disposing of the criticism that the persistence of the murmur might be due to imperfect obliteration of the vessel. The blood-pressure, which before operation had been 132/40, rose after it to 154/122 the diastolic remaining higher than normal for 6 weeks. During this time the renal function became and remained impaired, the standard urea-clearance 15 days after operation being reduced to 21·9 c.cm., (29·2% of the average normal) for the first hour, and 15·2 c.cm. (28%) for the second hour. There had been no preoperative evidence of any renal or urinary abnormality.

Early diagnosis.—Both these patients, known to have congenital heart disease, remained febrile for 4–5 months or more before infective endarteritis was diagnosed. Case 1 had become almost moribund during this period; case 2 was in much better condition. An early diagnosis is obviously desirable in cases of infection of the ductus where ligation is to be attempted. Symptoms of infection are not dramatic and influenza may be diagnosed even when pyrexia is persistent. In case 1 this remarkable absence of symptoms was again shown after operation when he felt perfectly well, although a positive blood-culture was obtained. The same comparative well-being occurred in case 2 with the commoner *Strep. viridans* as the causative organism. Any patient known to have a patent ductus arteriosus who runs a fever for more than a week without obvious cause should be suspected of infection in this region and investigated accordingly. In case 1 the continuance of the focal nephritis, which darkens the prognosis, can be regarded as in some degree due to delay in diagnosis. Obviously the earlier operation is performed the less chance there is of renal or other complications.

Diagnosis of the heart lesion.—In both these patients the physical signs were typical of patent ductus arteriosus. In both the high pulse-pressure and the teleradiograms were confirmatory. There was no evidence of any other congenital defect, or of infective endocarditis of any valves, though such negative evidence must be of only limited value.

Pathology of the lesion in relation to ligation.—Maud Abbott (1936) describes the original site of infection as always being at the pulmonary end of the patent ductus. This is narrower than the aortic end. From here the vegetations spread over the left pulmonary artery far sooner than into the aorta. Patches of vegetations are found on the wall opposite the opening of the ductus, presumably carried there by the blood-stream which flows from aorta to pulmonary artery. Eventually the pulmonary valves may be involved in the spread of the vegetations. Thus left-sided pulmonary infarcts are common. Radiological evidence of them was seen in case 2 and a large one was found at operation. There seems to be no preoperative method of establishing the length of the patent ductus. If the ductus is sufficiently long, ligatures should be placed at each end, special care being taken to obliterate the pulmonary end as completely as possible. Periarterial adhesion and fragility of the wall of the patent ductus accounted for fatal hæmorrhage in two of Touroff's cases (Touroff and Vesell 1940b). In our cases the ductus was easily defined, the wall appearing pink but firm. No hæmorrhage occurred during the manipulations necessary for passing two silk ligatures. In case 2 some oozing resulted from the fact that the inner aspect of a moderately large pulmonary infarct lay over the region of the ductus.

Bacteriology.—The organism isolated by blood-culture from the first case was a hæmophilus.

It was a small pleomorphic non-motile gram-negative coccobacillus and had no tendency to filament formation. In the first instance the organism was obtained in blood-cultures made in glucose broth incubated aerobically, where it appeared as small fluffy spherical masses on the surface of the blood. Later it was found that growth was considerably accelerated by cultivation in air to which 10% of carbon dioxide had been added. In subcultures the strain was found to lose its capacity for growth on solid media unless cultured in the presence of carbon dioxide. The colonies on solid media grown in the presence of 10% carbon dioxide were small, convex, with an entire edge, translucent and non-hæmolytic. The organism grew well on boiled blood-agar, Fildes agar, and 5% horse-blood agar. In 1% horse-blood broth and Fildes broth the organism grew well and gave rise to a slight granularity on the side of the tube. A scanty or moderate growth was obtained in the following media: serum broth, peptone broth, nutrient agar, serum agar, and inspissated serum. Well-marked satellitism occurred when serum or plain agar cultures were weeded with a colony of *Staphylococcus albus*. The organism did not grow in peptone water or in a filtered peptone water culture of *Staph. albus*. A growth did occur in peptone water to which X-factor in the form of hæmatin, or V-factor in the form of a heated yeast extract, had been added. The following sugars were fermented: mannite, inulin, dextrin, glucose, dulcite, arabnose, raffinose and salicin. Maltose, lactose, saccharose and galactose were not attacked. No indol was formed. The organism was agglutinated to a titre of 1 in 1250 by the patient's serum, but not by agglutinating sera of *Brucella abortus, Br. melitensis* or *H. pertussis*.

The morphology and cultural characteristics of this organism make exact identification difficult since it differs from *H. parainfluenzæ* described by Miles and Gray (1938) in its X- and V-factor requirements and from *H. influenzæ* in its biochemical reactions and affinity for carbon dioxide. Professor Miles has examined the organism and confirmed these findings; he suggests that the organism is an atypical strain of *H. influenzæ* resembling in its carbon-dioxide requirements *H. aphrophilus* described by Khairat (1940).

Sulphapyridine therapy.—Surgery would have been impossible in case 1 without previous sulphapyridine therapy, owing to the patient's very poor general condition. With sulphapyridine the patient had been afebrile for 3 weeks before operation. Although we have seen no case of this rare influenzal endarteritis treated with sulphapyridine alone, the likelihood of its being successful while the large mass of vegetations existed can be considered remote. With *Strep. viridans* infections it is well known that although temporary sterilisation of the blood-stream may be effected with sulphapyridine a fatal outcome is still nearly constant.

COMMENT

Hubbard, Emerson and Green (1939), in discussing the indications for ligation of the patent ductus arteriosus, conclude that the procedure should be limited to cases "showing evidence of circulatory embarrassment," among which they include signs of severe regurgitation. They doubted if ligation had any prophylactic value against subsequent infections. Time alone can answer this question. Gross has considered infection of the ductus a contra-indication because of the risk of producing embolism. Of this we have found no evidence in these cases, and such risk as there may be will certainly be diminished by early diagnosis and treatment. We are of the opinion that infection of the ductus arteriosus is a strong indication for ligation and should be combined with chemotherapy.

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CASE OF CRUSH INJURY WITH RECOVERY

A. IAN L. MAITLAND, M.B. GLASG., F.R.C.S.E.
SURGEON LIEUT.-COMMANDER R.N.V.R.; SURGICAL SPECIALIST, ROYAL NAVAL AUXILIARY HOSPITAL

THE following patient received a crush injury towards the end of April, 1941. He has been under observation for four months and recovery has now progressed sufficiently to warrant publication of the findings.

CLINICAL FEATURES

Healthy man, aged 40, buried for 15 hours under debris of bombed building. Was lying on back with right hand and forearm raised across face. Pinned by beams which pressed heavily on right arm, right side of body, right thigh and leg. First came under observation about 24 hours after he was extricated; only facts known about this period are that he had passed no urine since the burial 39 hours before, and that treatment had consisted of warmth, morphia and fluids by mouth.

At no time was consciousness lost, and on admission he could describe experience rationally. There were signs of considerable dehydration and shock with dry and dirty tongue. No evidence of internal hæmorrhage but signs of complete lesion of right brachial plexus with fullness and tenderness in right supraclavicular fossa. Weals over right antecubital fossa, right side of chest, abdomen, right buttock, outer side of thigh, over both knees and on right leg ranged in diameter from 2 to 4 in. and looked like superficial burns. He was vomiting slightly and complained of nausea. Urinary output during first 12 hours negligible; urine contained cloud of albumin, granular casts and epithelial cells; specific gravity 1016. Blood-pressure 110/90 mm. Hg; blood-urea 140 mg. per 100 c.cm.

On the second day of observation he developed signs of severe pulmonary concussion with blood-stained sputum; subsequent radiography confirmed the diagnosis. Right forearm and thigh were swollen, especially thigh, which was tense and brawny throughout its length. No effusion into knee-joint; posterior tibial and dorsalis pedis pulses full and easily palpable. Circumference at mid-thigh 5 cm. greater on right than left, and 5 cm. below antecubital fold 7 cm. greater on right side than left (table I).

TABLE I—INCREASE IN CIRCUMFERENCE OF LIMBS ABOVE MEASUREMENT OF NORMAL LIMB ON ADMISSION (CM.). THIGH WAS MEASURED 15 CM. ABOVE PATELLA (LEFT 45 CM. ON ADMISSION); LEG 15 CM. BELOW PATELLA (LEFT AND RIGHT 40 CM. ON ADMISSION); FOREARM 5 CM. BELOW ANTECUBITAL FOLD (LEFT 23 CM. ON ADMISSION).*

Day	Thigh		Leg		Right forearm
	Left	Right	Left	Right	
1	..	5	..	..	7
3	..	5	..	..	7
7	..	2	..	..	7
12	..	5	..	..	7
13	..	4·5	..	2·5	7
14	..	5	..	7	7
16	2·5	9	1·8	5	7
18	5	10	4	7	7
19	2·5	7	4	8·2	7
22	5	10	3	8	7
26	..	6·2	pr.	pr.	pr.
27	..	5	"	"	"
28	..	3	"	"	"

pr. = slight œdema still present.

* After the patient's recovery the circumferences of the thighs and legs were the same on the two sides. The right forearm was then much wasted so that the measurement was no indication of that on admission. I have measured the forearms of a number of people, who, like the patient, are right-handed, and find the circumference of the right averages 1 cm. more than the left.

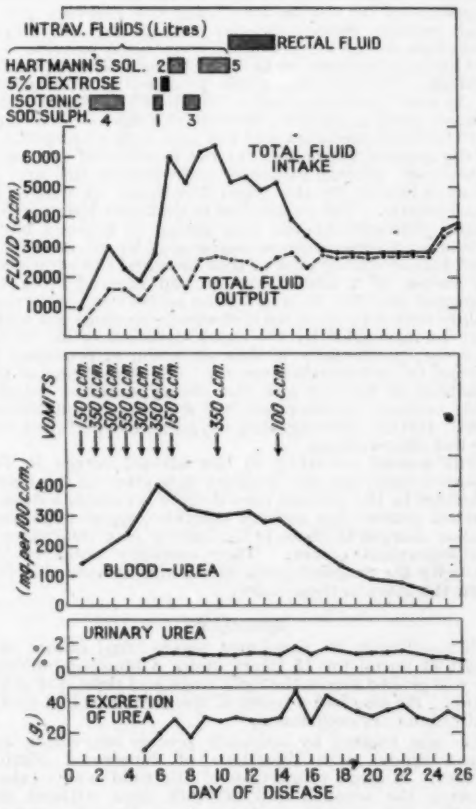
The case was recognised as a crush injury as described by Beall and Bywaters,[1] with pulmonary complications and a complete lesion of the right brachial plexus.

TREATMENT

At that time (April, 1941) 17 cases of this type had been described with 12 deaths.[1 2] Of the fatal cases 1 died of

1. Bywaters, E. G. L. and Beall, D. *Brit. med. J.* 1941, **1**, 428.
2. Beall, Bywaters, Belsey, R. H. R. and Miles, J. A. R. *Ibid*, p. 432; Mayo White, R. and Solandt, O. M. *Ibid*, p. 434; M.R.C. Subcommittee on Traumatic Œdema. *Ibid*, p. 449.

intercurrent septicæmia, in the other 11 the fluid intake had been relatively small and principally made up of serum, concentrated serum, plasma or whole blood. Since the treatment was admitted to be in the stage of trial and error



(Beall and Bywaters) a different approach was tried. This was based on complete protein starvation and forced fluids. Protein starvation was used because the biochemical findings in these cases suggested that more products of protein autolysis were being thrown into the circulation than the damaged kidneys could dispose of. On this assumption it seemed reasonable to add no more protein to that already there until there was evidence that it could be utilised and the end products excreted. Every form of protein was therefore withheld for 18 days, a low protein diet was then instituted and not till the 30th day was a normal diet free of protein restrictions allowed. The pathological appearances described in the kidneys associated with a mounting blood-urea and diminished urine were similar to the changes of congestive renal failure, as I have pointed out elsewhere.[3] In view of this it seemed worth while to employ the usual treatment for that condition. During the first few days the intake by mouth was small and most of the fluid was given intravenously in the form of isotonic sodium sulphate solution. The chart shows that despite a considerable intake of this solution no real diuresis took place and the blood-urea mounted steadily. When the peak of 400 mg. per 100 c.cm. was reached on the 6th day it was felt that the risk of death from pulmonary œdema was less than that from uræmia and fluid was pushed in by every available route. Rectal fluids were tried, but owing to the uræmia were not tolerated until the 11th day; fortunately the patient was able to drink between 5–6 pints daily and thus an enormous daily intake was achieved. The intravenous solutions used in the period between the 6th and 11th days are shown on the chart. Hartmann's solution was used in the later stages because of its close similarity to blood-plasma without the protein elements; in any case the need for sodium sulphate was no longer evident when the urinary output reached 2000 c.cm.

3. Maitland, A. I. L. *Ibid*, p. 570.

In view of the extensive necrosis of muscle and lesions of the adrenal cortex which had been reported, extract of suprarenal cortex was given from the start. Eucortone 4 c.cm. was given daily for 24 days and 5 c.cm. daily for a further 8 days.

Unfortunately the blood-chlorides, were not estimated until the 15th day and the blood-potassium and urinary chlorides were not estimated at all. Sodium chloride was given from the 18th to the 30th days in a daily dose of gr. 135 except on the 27th and 28th days when the dose was gr. 270. The highest of a very irregular series of blood-chloride figures occurred on the 28th day (table II).

In the later stages—6th week onwards—iron was given in massive doses. It was given continuously for 7 weeks and during the last 4 liver was given as well in an endeavour to correct the persistent anæmia. The appropriate drugs were used for the intercurrent complications and latterly ascorbic acid and vitamin B_1 have been used as part of a tonic regime. They appear to have improved the anæmia, but whether this will be permanent is questionable.

Local treatment was simple. The abrasions and weals were painted with 1% crystal violet solution. The affected limbs were placed in the position of rest; and as soon as possible an abduction frame was applied to the paralysed arm and physiotherapeutic treatment instituted.

PROGRESS

General condition remained very poor during first 10 days, with characteristic signs of uræmia. Thereafter improvement gradual and slow; with slight psychic disturbances about 18th day. On 38th day bronchopneumonia developed in left lower lobe; when recovering from this acute infection of throat with hæmolytic streptococci developed. Since this cleared up convalescence has been without incident. Blood-pressure readings are shown in table II. The blood-counts and hæmoglobin estimations in table II reveal constant degree of anæmia which is persisting despite treatment and is highly suggestive of some permanent renal damage. Ioteric index was estimated by Meulengracht's method on 5th, 7th and 15th days; figures were all within normal limits (2, 4 and 5 units respectively). Clotting-time done on 7th day very prolonged (20 min., normal control 5 min.) Method of Lee and White used and estimation not repeated.

TABLE II—BLOOD-CHLORIDES, BLOOD-PRESSURE, HÆMOGLOBIN AND RED-CELL COUNTS

Blood-chlorides*		Blood-pressure (mm. Hg)			Day	Hæmoglobin (%)	Red cells (per c.mm.)
Day	mg. NaCl per 100 c.cm.	Day	Syst.	Diast.			
15	220	2	110	90	13	62	
19	500	4	125	85	15	63	2,540,000
21	500	5	110	80	21	68	
23	125†	6	120	80	43	70	3,285,000
25	100†	8	120	95	56	70	3,400,000
28	700	9	150	90	63	68	3,490,000
30	300	10	140	75	70	80	4,000,000
36	200	11	140	80	78	70	3,880,000
					84	82	3,700,000
					95	76	3,500,000
					102	80	3,700,000

* By Whitehorn's method.
† These two results are low because the blood was allowed to stand for some hours before the estimation was done. They must therefore be discounted.

Urine was examined daily during first 4 weeks and varied little. Specific gravity remained between 1014 and 1012 for 12 days and thereafter dropped gradually to 1004. Daily output (see chart) rose slowly to 2500 c.cm. on 7th day and remained around that level throughout period of observation. Urinary urea was estimated by hypobromite method using a Doremus ureometer. Albumin constantly present; at first as light cloud, but after 15th day only as trace. Epithelial cells present in first specimen only; thereafter for first 6 days granular and hyaline casts and red blood-cells noted. Casts present for further 4 days; after that only occasional red cell seen. First specimen of urine was negative to reduced phenolphthalein test and contained no red cells. Urine never contained pigment and no pigment casts were observed. Blood-urea estimated by modification of Falen's method.

Urea clearance was done 5 times and the results were as follows:

Day of disease	Blood-urea (mg. per 100 c.cm.)	Av. % of normal function
6	400	7
13	227	15
20	80	41
36	42	65·5
102	32	91

The swellings of right arm and right thigh were entirely different in character. Arm was seat of true œdema, greatest in dependent part of upper forearm, produced by deep hæmatoma around neurovascular bundle in supraclavicular area and due to stasis in veins and lymphatics of arm. It was present from the beginning and did not vary in size until it finally cleared up. Swelling of thigh was not true œdema but a brawny induration which did not pit on pressure and was most firm and longest in evidence under the weals. True œdema supervened later, affecting right leg first on 13th day and appearing in left leg and thigh on 16th day; some œdema also appeared over lumbar region on 22nd day (table I).

PRESENT CONDITION

Four months after injury is able to be up most of day. Blood-pressure 110/60, fundi normal and lungs have recovered completely. No relative wasting of right thigh but muscles very weak and resultant instability has produced small effusion into knee-joint. Left leg can be extended indefinitely against resistance of 10 lb. 32 times per min., but right leg can only be extended 18 times against resistance of 2 lb. 14 times per min. before fatigue supervenes; renal function has recovered almost to normal. Urine normal; sp. gr. 1012. Anæmia persists and appears to be resistant to treatment; brachial-plexus lesion is represented by recovering ulnar palsy.

DISCUSSION

The most striking feature of this case is the high proportion of the large fluid intake which was retained between the 7th and 15th days. During these 8 days 25·5 litres was retained without any great increase in the swelling of the limbs or the appearance of anasarca. The œdema which did eventually develop did not appear till the 16th day and reached its maximum between the 19th and 22nd days. This retention cannot be ascribed entirely to the administration of cortical extract and other factors in treatment, since the bulk of the fluid remained in circulation for at least 6 days. It must therefore have been required as a diluent of some abnormal substance in the blood, probably a high molecular protein derived from the damaged muscle. The two cases of this syndrome recently reported [4] appear to have had a similar course to the one described here. Unfortunately the fluid retention, if any, in each case is not stated. In one of them (Longland and Murray), however, the clinical features suggest that a true transfusion kidney cannot be excluded; since the patient had a rigor after a plasma-transfusion, followed by icterus and unaccompanied by swelling in the injured limbs.

The glomeruli of the kidney are supplied with blood direct from the interlobular arteries through the afferent glomerular vessels; the tubules and loops of Henle are supplied by capillaries derived from the efferent glomerular vessels, and the collecting tubules and ducts of Bellini are supplied from the main branches of the renal vessels through the arteriæ rectæ. The lesion associated with the crush syndrome is situated in the convoluted tubules and loops of Henle, and it will be seen that the blood-supply of this area comes through the reducing chamber of the glomerular capillary bed. There, not only is the pressure reduced but the blood is concentrated by the loss of fluids and salts secreted by the glomerulus. In the light of this knowledge a cause for the lesion suggests itself. In all the cases described severe shock has been a feature. This is shown by the low blood-pressures recorded. In some cases both systolic and diastolic pressures have been low; in this case the systolic pressure alone was low. It can be presumed that this shock has its onset when the patient is first buried and therefore is prolonged over many hours. This will produce in the capillaries of the convoluted tubules a vicious circle of vascular stasis, hæmoconcentration and thus more stasis. These changes will be increased by the absence of fluid intake during the buried period and the flooding of the circulation with a protein of high molecular weight from the damaged muscle. There is experimental evidence [5] that a rapid elevation of blood-pressure during the recovery period may produce further tubular damage by intensifying this stasis in the vessels of the convoluted tubules.

This hypothesis is supported by the following clinical evidence: (1) the invariable presence of abnormality in the first specimen of urine examined; (2) the common critical point in all cases between the 6th and 8th days; (3) the fatal termination in one case despite amputation of the crushed limb; and (4) the recovery of two severe cases with general measures only during the first 24 hours followed by the usual treatment of congestive renal failure. The conclusion is that this lesion is produced primarily by the long period of lowered blood-pressure or pulse-pressure aggravated by the absence of fluid intake during part of that time and the presence of an excess of a circulating protein derived from the damaged muscle. It is in fact an active congestive renal failure with a possible toxic element superimposed and it may be intensified by too rapid elevation of the blood-pressure, particularly if that elevation is produced by plasma or concentrated serum. The experience of this condition is limited and the theory outlined requires more evidence for its proof, but it seems reasonable and worth further investigation by animal experiment and clinical observations.

The lesions described in the adrenal cortex in two reported cases and the irregular behaviour of the blood-chlorides in the present case despite a constant dose of cortical extract and sodium chloride suggest that some similar changes to those in the kidney may take place in the suprarenal cortex. They certainly point to the necessity for examining the blood and urinary chlorides from the start in these cases.

SUMMARY

A man, aged 40, developed severe renal failure as a result of burial for 15 hours under a bombed building. He was pinned across the right thigh and right side of the trunk. He also had a lesion of the right brachial plexus and pulmonary concussion.

He was treated by complete protein starvation and forced fluids, with injections of suprarenal cortical extract. A large proportion of the fluid was retained between the seventh and fifteenth days without any corresponding increase in the œdema, though a general anasarca was present from the sixteenth to the twenty-eighth day.

Improvement began on the tenth day, and four months after the injury the patient appears to have made a good recovery, in spite of an intercurrent bronchopneumonia and a streptococcal infection of the throat. An anæmia persists in spite of treatment, which suggests some renal damage not evident to tests of function; and the affected thigh, though anatomically normal, has lost almost all its extensor power.

It is suggested that in such cases the renal failure is caused by vascular stasis due to lowered blood-pressure from the time of the injury, to the lack of fluid intake during the period of burial, and to flooding of the circulation with protein from damaged muscle. The lesion in the kidney may be aggravated by transfusion with plasma or concentrated serum.

I have to thank Surgeon Rear-Admiral F. J. Gowans for permission to publish this case; Surgeon Commander R. S. Allison for his help and criticism during the treatment of the case and preparation of this paper; and C. P. O. Webster and the staff of the clinical laboratory for the estimations.

4. Henderson, R. G. *Ibid*, 1941, **2**, 197; Longland, C. J. and Murray, J. *Lancet*, 1941, **2**, 158.

5. Miller, H. *Brit. med. J.* 1941, **1**, 685.

MEDICAL DEFENCE UNION.—The annual meeting of this society was held on Sept. 30. Dr. G. de Bec Turtle, acting president, who was in the chair, said that the membership was now over 24,000. War had not decreased litigation and he urged doctors to exercise great care in signing medical certificates. Dr. Turtle was elected president for the coming session.

CYCLOPROPANE ANÆSTHESIA

R. BLAIR GOULD, M.B. SHEFF., D.A.
HONORARY ANÆSTHETIST TO GOLDEN SQUARE THROAT HOSPITAL; SPECIALIST ANÆSTHETIST IN THE E.M.S.

MANY papers have appeared on the pharmacological and physiological aspects of cyclopropane. I shall here deal with the application of this knowledge to its administration as an anæsthetic, in the light of experience I have gained during the past few years.

Perhaps in no other type of anæsthesia is the apparatus used of such importance, for an inaccurate, leaking, inflexible apparatus will make for failure, and greatly add to the difficulties of the administrator. The principles of an ideal apparatus have been described by Harris (1933, 1935, 1938), and I agree with him in favouring the circle filter as against the to-and-fro principle of Waters (1932). Although the latter has the advantages of portability and simplicity it is difficult to handle: the irritant soda-lime is too near the face-piece, greatly increasing the danger of its inhalation: while the heat induced in the canister directly affects that part of the gas mixture which is immediately inhaled. On the other hand, the circle filter if correctly designed provides a flexible apparatus which more closely satisfies physiological requirements, and with an adequate canister can produce a more complete absorption of carbon dioxide. In contrast to the method practised by most anæsthetists, I find that less resistance to respiration is produced when the canister is placed on the inspiratory side of the circuit, and this clinical impression is supported by manometric readings of the resistance induced in various types of apparatus at the face-piece end of the circuit.

Sensitive directional valves, offering the minimum respiratory resistance, are a necessity. They should be designed to work efficiently with the reduced tidal respiration met with in deep anæsthesia. They should be placed as close to the face-piece as possible, for theoretical considerations, fully explained by Harris, demand that the dead space between the unidirectional valves and the alveoli should be less than the volume of the smallest tidal respiration. (Placing these valves on the machine takes no account of the expansile nature of the long rubber tubing between the valves and face-piece, and permits excessive re-breathing, especially when pulmonary ventilation is reduced.) This ideal is almost impossible to attain, but the closer it is approached the less will be the respiratory embarrassment, the smoother the anæsthesia, and the less fatigued the patient at the end of a long operation.*

ESTIMATION OF DEPTH

The quietness of the breathing under cyclopropane is due not so much to the carbon-dioxide method of administration as to the depressant effect of the gas on the respiratory centre. The usual signs of anæsthesia as seen with ether are not helpful, and estimation of depth is difficult. Passage through the first two stages is very rapid and no excitation of respiration is seen even in induction; in the third stage a slight and progressive decrease in rate and tidal volume occurs, until intercostal paralysis is complete; a small increase in concentration will now cause respiratory arrest.

Waters (1936) has shown how the patient may pass through the third stage without manifest signs except a gradual diminution in respiratory movement. The increase in rate and depth of respiration which usually occurs with other agents just before respiratory arrest is slight or lacking with cyclopropane, which makes it difficult to differentiate the pre-apnœa level. Attention to detail is therefore essential. Romberger (1935, 1937) and Guedel (1937) have described a system of anæsthetic signs, but these are not complete, because they fail to take into account the phenomenon of general muscular relaxation; they are also often difficult to assess, especially in cases where the respiratory threshold has been elevated by preoperative drugs.

I find the following simplified scheme (worked out with reference to the respiratory signs only) satisfactory for teaching purposes. Where planes of anæsthesia are referred to in this paper this scheme is to be understood.

Third stage	*Signs*
First plane:	Light anæsthesia; moving eyeballs.
Second plane:	
(Upper):	Moderate anæsthesia; fixed eyeballs; intercostal paresis absent or partial only.
(Lower):	Deeper anæsthesia; intercostal paralysis becoming complete. (The diaphragmatic movement is not exaggerated as it is with ether.)
Third plane:	Intercostal paralysis has developed gradually and progressively, without any change in the character of the breathing, which is now almost entirely diaphragmatic. A slight increase in concentration now leads to
Fourth plane:	Apnœa, at first with no signs of circulatory depression. This rapidly passes into
Fourth stage:	Apnœa with circulatory depression; impending cardiac failure and death.

It will be seen that the depth of anæsthesia is reflected with great accuracy by the extent of depression of breathing, and this may be used as a more accurate and easily determined method of estimating the "plane level" during the third stage than an attempt to assess the degree of paralysis of the intercostal muscles. The exact points where intercostal paralysis begins and becomes complete (which mark the upper and lower limits of Guedel's third plane) are often impossible to determine in practice. More useful information can usually be obtained from observation of the breathing bag and manometer than from palpation of the chest wall.

The general phenomena of anæsthesia—loss of consciousness and reduction or abolition of the reaction to pain—are due solely to the action of the anæsthetic agent on the brain. Estimation of depth of anæsthesia as taught to generations of students, depends on the effect on the respiratory function. Muscular relaxation, in which the surgeon is more interested, appears to depend on diminution of skeletal-muscle tone as the centres in the C.N.S. become depressed; and in particular on depression of the anterior horn cells of the spinal cord, and suppression of stimuli normally reaching these cells from the cerebrum, cerebellum, basal ganglia, skin, joints and muscles (Beecher 1938, Yandell Henderson 1935a and b, 1937, Samson Wright 1940). As a rule cord-reflex arcs are suppressed early in the third stage of anæsthesia, but it is not always easy, at any rate with cyclopropane, to correlate the degree of depression of muscle tone with the degree of depression of respiratory activity. There is evidence that there may be variation, not only between anæsthetic agents, but also between patients (Magnus, R. quoted by Henderson 1933). With cyclopropane, apnœa may occur before relaxation—i.e., the respiratory centre may be paralysed before the cord-reflex arcs are depressed sufficiently to give relaxation—and it is important to prevent this.

The drug is certainly difficult to administer in cases where deep surgical relaxation is required. Diaphragmatic quietude is always present, and the rapid, panting, jerky movements which are such a source of embarrassment to the surgeon with ether are not seen. The peritoneum is always easily relaxed, and the intestines are not distended (as they are with the patient under nitrous oxide, which is apparently excreted into the intestinal lumen).

Animal experiment shows that with cyclopropane intestinal tone is increased and the gut is contracted, while the amplitude of contractions is reduced and propulsive movements abolished. (Peoples and Phatok 1935, Burstein 1938, Weisel et al. 1938). These signs may, however, be present with some degree of muscular rigidity, and to abolish this while keeping the cerebral concentration below apnœa level is not always easy. In my experience, this may most readily be accomplished with safety to the patient by the technique of slow induction presently to be described. This is facilitated by the reduction of preoperative sedation to a minimum.

Since the C.N.S. constitutes only about 5% of the total adult body-weight, the anæsthetic is distributed between a small bulk of tissue upon which it has physiological action, and a far larger bulk of tissues upon which it has

* Special valves which I have designed, modified from a pattern kindly supplied to me by Dr. Harris, and which are sensitive to very low minute volume respiratory exchange, do, I believe, closely satisfy these criteria.

virtually none. Thus the concentration of the drug in the nervous system will be influenced by its solubility in the rest of the tissues. This buffering action of the body tissues delays both induction and elimination. With cyclopropane primary saturation †—that is, equilibrium between lungs, blood and brain—occurs quickly, at a time when concentration in other body tissues is minimal (Barbour 1936, Waters 1936, Robbins 1937). Thus it is possible to reach a brain concentration sufficiently high to cause apnœa, while the body tissues generally are almost completely unsaturated. With cyclopropane given in a completely closed system, after primary saturation has been reached a relatively high alveolar concentration must be maintained in order to keep the arterial tension at an anæsthetic level, since diffusion will gradually occur into the other body tissues. The extent of this diffusion can be estimated from finding of Orcutt and Seevers (1937) that the body fat will hold, under conditions of equilibrium, about seven times as much of this gas as the other body tissues.

TECHNIQUE

Induction.—The following considerations must be borne in mind about induction with cyclopropane:

1. Absence of irritation and rapidity of absorption in the central nervous system allow a smooth induction without respiratory stimulation and usually without excitement.

2. A high degree of respiratory depression can be easily induced at an early stage in anæsthesia, and indeed at any stage, but this bears no relation to the degree of muscular relaxation produced.

3. Depression of spinal cord reflex arcs (and hence muscular relaxation) can be achieved without the production of prolonged apnœas if the principles on which body saturation depends are remembered.

4. Until an appreciable body saturation has been built up, the absorbing capacity of the inert tissues is so great that it is often impossible to get relaxation without producing considerable depression of the respiratory centre, and even prolonged apnœa. This is by no means invariably safe.

5. The high oxygen content of the anæsthetic atmosphere is not incompatible with severe anoxæmia if pulmonary ventilation becomes inadequate.

For these reasons, I find a slow induction with small rate of flow of gas satisfactory, though this is contrary to the practice usually advocated (Bonham 1937, Griffith 1935, Rowbotham 1935). I continue with a flow of about 100 c.cm. per minute or less until respiration becomes almost imperceptible. The extra time required is not appreciable. Should apnœa occur at the end of this slow induction it is usually short and gives rise to no anxiety, for the fatty tissues, at this time relatively poorly saturated, provide a safety valve, and redistribution rapidly takes place. Alveolar concentration is maintained by a continuous trickle of a very small flow of gas, the object being to build up a concentration in the tissues which, while remaining below the apnœa level, will depress the motor system sufficiently to produce muscular relaxation. The bag should contain only enough gas to accommodate tidal respiration; it is better not to allow the breathing bag to become distended with an accumulation of gases of unknown relative composition (Burford 1936). Variation in the flow of cyclopropane or of oxygen then quickly shows itself in a lightening or deepening of the anæsthesia, collapse or distension of the bag; and maintenance of an even anæsthesia is facilitated. Manometric observations at the face-piece end of the apparatus show that distension of the bag unduly increases the pressure within the apparatus, thus increasing the load on the respiratory system.

Maintenance.—Redistribution of cyclopropane, its diffusion through the skin and rubber components of the apparatus, loss through the open wound and in blood spilt during the operation, and inevitable leakage, cause a progressive lightening of the anæsthesia. Inaccurate delivery of oxygen may enhance this effect. Unless the patient is closely observed the quiet breathing in all planes makes alteration in depth of anæsthesia easy to miss, particularly as, in ascending anæsthesia, eyeball movements do not always recur to mark the return of the first plane. There is a point in descending anæsthesia, at the upper part of the first plane, where vomiting may occur if the anæsthetic is not deepened rapidly; the breathing at this point is shallow. If the patient is allowed to reach this point again during ascending anæsthesia the breathing may become imperceptible or cease altogether, which leads to confusion with the third plane. Apart from alterations in respiratory volume, there is no satisfactory sign to warn against too light anæsthesia until the swallowing reflex becomes active, for muscular relaxation, once produced, does not always disappear at the same rate as the respiratory function recovers. Ascending anæsthesia may best be assessed by observation of the manometer attached to the breathing bag; this, in my opinion, should form an essential part of every closed circuit machine (Harris 1938).

Apnœa.—The high oxygen concentration possible with this anæsthetic gives the anæsthetist a feeling of confidence, and the ease with which apnœa can be produced, with associated stillness of the diaphragm, is very striking. To produce "controlled respiration" by inducing acapnia is easy; muscular relaxation, however, is not invariably produced by such techniques, nor can they be employed in every case without risk.

The possible harmful effect of the indiscriminate production of prolonged apnœas is illustrated by a fatality I have already reported (Gould 1939), and is supported by much experimental evidence. Robbins and Baxter (1937) found that during periods of apnœa in dogs, though the mixture in the breathing bag contained adequate oxygen, the arterial oxygen concentration rapidly fell. In a typical experiment, the arterial oxygen concentration fell from 20 vols. % to 2 vols. % during 20 minutes' apnœa.

Lengthy inadequate ventilation can bring about a state of anoxæmia, notwithstanding the high oxygen concentration in the apparatus, and considerable damage may be caused to the brain and heart. Gebauer and Coleman (1938) and Henson (1937) record cases of encephalopathy after cyclopropane due apparently to nerve-cell deprivation of oxygen, in spite of the high concentration of oxygen available. Schreiber (1939) and Courville (1939) have drawn attention to the untoward effects of unsuspected anoxia which may develop during anæsthesia unless careful and continuous observation is maintained. In shocked, cachectic, poor-risk patients, and those with decreased cardiac reserve production of apnœa is contra-indicated. Individual susceptibility and cardiac reserve are not invariably easy to assess before operation. By avoiding heavy preoperative medication, muscular relaxation can usually be produced by the slow-induction technique without the production of potentially dangerous apnœa.

COMPLICATIONS

Cardiac Irregularity.—The cause of the cardiac irregularities observed with this drug is obscure. Seevers (1934), Robbins and Baxter (1937) attributed their onset to the anoxia which may develop during apnœa. Anoxia undoubtedly plays a major rôle, but does not offer a complete explanation. Kurtz (1936), Meek and others (1937) and Eversole (1937) have described effects which they attribute to a direct toxic action of the drug on cardiac tissue. Robbins and Baxter (1937), and Robbins (1940a, b) describe these effects as invariably arising in animals when morphia is used as a premedicant, and less frequently when barbiturates are substituted. Intravenous injection of amytal abolished the bradycardia and arrhythmia which developed in their experimental animals at the time of, or soon after, respiratory arrest (Robbins, Baxter and Fitzhugh 1939). They conclude that morphine enhances, and barbiturates neutralise, the simulating effect of cyclopropane on the parasympathetic system (Robbins 1939, Adriani et al. 1940). These findings accord with clinical experience.

The exact significance of these cardiac irregularities cannot be assessed at present, but animal experiments support the clinical observation that, however produced, they disappear spontaneously as the anæsthetic concentration is reduced by increasing the oxygen concentration and improving the respiratory ventilation; and that

† The terms "primary," "secondary" and "tissue" saturation have unfortunately become identified with the technique described by McKesson (1926), who used the first term to signify "induction," and the others to describe his method of obtaining profound anæsthesia with nitrous oxide by producing a high degree of anoxæmia. The meanings are not to be so understood in the present paper.

they leave behind no ill effects. They are not accompanied by circulatory deterioration, provided that hypo-oxidation is avoided. Histotoxic anoxæmia does not appear to be a complication of cyclopropane anæsthesia provided a sound technique is employed. The pulse must be continuously examined so that this condition can be recognised early, when it may be readily abolished by increasing the oxygen concentration. The use of adrenaline or other sympathomimetic drug should be avoided with cyclopropane (Orth et al. 1939, Meek 1940).

Excess Oxygen.—Cyclopropane is administered in an atmosphere of 70–80% oxygen. Beecher (1938) states that "there is no doubt that many of the toxic signs and symptoms elicited in man and animals by high oxygen concentrations are frequently seen after anæsthesia in which excess oxygen has been given," and concludes, "one may question the wisdom of administering high percentages of oxygen in anæsthesia for any length of time, at any rate to patients who are recumbent, cachectic, old or otherwise poor risks."

These toxic signs are said to include congestion of the lungs, with thickening of the alveolar walls and the presence of definite inflammatory changes, as shown by eosinophil cells therein (Haldane and Priestley 1935, Binet 1939, Behnke 1940). Horn 1938, Bonham 1939a, and Griffith 1938, have described cases of acute respiratory embarrassment resembling allergic phenomena and even acute pulmonary œdema in the course of cyclopropane anæsthesia; these have been attributed to the use of excessive concentrations of oxygen. In the light of more recent experience of oxygen therapy, however, there is some difficulty in justifying such statements. Boothby (1938, 1939), for example, has described the practice at the Mayo Clinic where oxygen in high concentrations has been administered to many patients every 3 or 4 hours for as long as four days, with intermissions of a few minutes only, without any evidence of pulmonary irritation.

The oxygen content of arterial blood is increased by only 10–15% as a result of inhaling 100% oxygen; this amount, though negligible where the circulation is normal, has a significant effect in preventing tissue anoxia and in improving the general condition of patients whose circulatory system is depressed by shock, cachexia or old age (Card et al. 1940). In my experience, cyclopropane, because of the atmosphere of excess oxygen with which it can be administered, is one of the most valuable anæsthetic agents we possess for such cases (cf. Frias 1939).

Postoperative Pulmonary Complications, though fewer than are usual with ether, were not entirely eliminated in my series. Apparently this has been common experience (Stiles et al. 1934, Moffitt 1936, Taylor et al. 1937, Schmidt and Waters 1935). The hope that lack of irritant properties in cyclopropane would materially reduce these complications was not founded on sound reasoning, for with spinal anæsthetics, for example, as with other types of local or regional anæsthesia, no direct irritation to the lungs can occur, and yet pulmonary complications are fairly common sequelæ. Pulmonary postoperative complications are probably due to a combination of prolonged depression of body tone and pulmonary atelectasis (Fine et al. 1938, Coryllos and Birnbaum 1932, Boland and Sheret 1928, Duff 1939, Burford and Jones 1938, Griffith 1934, Leuth 1938). Irritation of the lungs by the war gases produces œdema, a totally different pathological condition from that following operations. Spinal anæsthesia abolishes completely the tone in those parts of the body anæsthetised, and in many cases over the whole body, and this explains the frequency of pulmonary sequelæ. There is therefore little ground, if any, left for the belief once general, that irritation of the lungs by the vapour of ether or other volatile anæsthetics is the cause of pulmonary complications after inhalational anæsthesia. The underlying cause is atelectasis—alike after spinal, local, intravenous or inhalational anæsthesia—due to diminished body tone and subsequent collapse of the lungs (Yandell Henderson 1935a, b, 1936 and 1937, and Ayre 1938).

The improved postoperative condition of patients after anæsthesia with cyclopropane is due to the comparatively non-toxic nature of this drug; the ease with which depth of anæsthesia may be varied at will, so that profound muscular atonia is not maintained over long periods; and the rapid recovery of consciousness and body reflexes, accompanied by a similarly rapid recovery of muscular tone, which occurs unless operative shock has been severe. This rapid recovery, although always desirable (Harms 1939), sometimes proves embarrassing. After cyclopropane the prolonged stupor and inertia seen after the older anæsthetics does not occur. Displacement of nitrogen, however, is a real danger, and care must be taken before the anæsthetic is withdrawn, to restore a more normal alveolar atmosphere. Barach (1935a, b, 1936). Bonham (1939b), Eversole (1938) and Burford (1938) have suggested that helium, which is very slowly diffusible, should be added to the gas in the closed circuit machine. Helium though easily obtainable in America is difficult to obtain in this country, and I have been unable to get experience of this technique. Other precautions must be taken. The anæsthetic must not be withdrawn until the respiratory ventilation is again active and adequate. The lung bases may be aerated, the tone of the respiratory muscles increased and lost nitrogen be replaced to some extent at least, by the inhalation towards the end of the operation of a mixture of carbon di-oxide and air (not oxygen); often this may be continued with advantage for five minutes every hour, for some hours, during the recovery period. By these means the incidence of postoperative lung complications may be reduced.

CONCLUSIONS

The final assessment of cyclopropane as an anæsthetic has yet to be made. No attempt has been made to compare results of the 500 cases on which this paper has been based with those obtained with any other anæsthetic agent. In my opinion some hundreds of thousands of cases would be necessary in order to do this with any approach to accuracy, since conditions vary so much from hospital to hospital, surgeon to surgeon, and anæsthetist to anæsthetist. But some propositions may be formulated on the experience gained.

1. Cyclopropane produces a smooth induction without excitement, and quiet, even, breathing, with no irritation of mucous membranes. It is associated with a high oxygen content of the anæsthetic atmosphere which is of value in many cases.

2. Depth of anæsthesia is under direct and easy control, and muscular relaxation is usually excellent.

3. It produces safe anæsthesia without anoxæmia, carbon dioxide accumulation or irregular, struggling, respiratory movements, even in patients whose vital capacities are limited by disease. It is relatively non-toxic to body cells.

4. There is a rapid return of consciousness, of the cough and other reflexes, and of general body tone. Postoperative nausea and vomiting are decreased, and anæsthetic shock reduced. Compared with ether, the postoperative state is more pleasant to the patient and more satisfactory to the surgeon.

5. Many of the cases in this series were suffering from acute respiratory disease of one form or another, and the postoperative results in these cases were excellent—in most of them some form of local or regional analgesia was the only alternative.

6. Although the expense of cyclopropane and of its apparatus is greater than of other routine anæsthetic drugs, the saving in postoperative convalescence makes this worth while.

On the other hand, there are some drawbacks: the gas forms an explosive mixture with oxygen; there is more operative bleeding; and transient cardiac arrhythmias occasionally develop which, however, do not appear to be of great significance. The technique is complicated, and the drug is not one to be administered lightheartedly by the tyro. Close attention to detail is essential, and the margin of safety is probably less than with ether. The advantages of cyclopropane over ether, however, far outweigh, in my opinion, any possible disadvantages. It may be objected that theoretical considerations have been given a disproportionate place in this paper, but I believe that understanding of underlying principles must always precede practical advances.

Closer alliance of the anæsthetic departments of hospitals with the pharmacological and physiological

laboratories is a development which has been long overdue.

I wish to thank the many surgeons with whom I have had the privilege of working during the past few years. Since some of the work which formed the basis of this paper was performed at various L.C.C. hospitals, I am grateful to Dr. W. Allen Daley for his permission to publish.

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EXTENSION OF TEMPORARY REGISTER.—Up till now an overseas doctor could only obtain temporary admission to our medical register if he was by law entitled to practise in his own country, and doctors who had passed the necessary examinations but were debarred from practice by racial or other legislation were thus unable to obtain temporary registration here. A new defence regulation and a new order have now been made and a doctor may now register if he is: of good character; holds a medical diploma (or has passed the examinations for the diploma) recognised by the G.M.C.; has been appointed as a medical officer in an approved hospital or as an assistant to a doctor on the permanent register. Registration does not affect an alien's obligation to comply with the aliens acts and orders.

GASTRO-COLIC FISTULA COMPLICATING DIABETES MELLITUS

IAN M. ANDERSON, M.B. GLASG., M.R.C.P.

PHILIP HAMILL, M.D. CAMB., D.SC. LOND., F.R.C.P. — ROBERT GALLOWAY, M.B. EDIN., F.R.C.S.E.

(From an E.M.S. Hospital)

CASES of gastro-colic fistula are not often reported. Verbrugge (1925) collected 202 cases from the literature; Poynton and Macgregor (1930) collected 250 cases and reported 1 case. Fairley and Kilner (1931) reported 3 cases, Mindline and Rosenheim (1935) a case and Bennett and Hardwick (1940) reported another. The case reported here occurred in a diabetic, causing serious difficulties, and it illustrates a technique for the management of a diabetic patient in preparation for a serious abdominal operation and in after-treatment.

CASE-HISTORY

A male civil servant, aged 52, was admitted to hospital on March 20, 1940, in diabetic coma. He was semi-comatose, breathing deeply, in severe ketosis and with a blood-sugar of 0·46 mg. per 100 c.cm. For 6 years prior to admission he had been a known diabetic and had been fairly easy to stabilise; 18 months before admission he had undergone a gastro-enterostomy for a gastric ulcer; thereafter he had been well until a month before admission, when one evening after dinner he felt a sudden severe abdominal pain which continued until the next day; it left him with diarrhœa which persisted with occasional exacerbations up to the time of admission. Owing to his abdominal discomfort and liability to diarrhœa he had become erratic in his diet and at times had had severe hypoglycæmic attacks. Before the pain and diarrhœa began he had been stable on 20 units of zinc protamine insulin and 20 units of ordinary insulin daily, but since then the dosage had had to be greatly reduced; indeed, for the 2 days before admission he had had no insulin at all.

In hospital there was a satisfactory response to insulin, dextrose and intravenous saline, and after a week he was receiving a 1400 calorie diet and in 3 weeks a 2100 calorie diet with three doses of 10 units of ordinary insulin daily. On this diet his morning blood-sugar was high, so his evening dose of insulin was increased to 20 units. He then developed a severe nocturnal hypoglycæmic attack. At the same time the diarrhœa increased and he lost weight. The diarrhœa now became persistent, especially at night, and he had nocturnal hypoglycæmic attacks in which he sweated profusely and became extremely violent and disoriented. On May 10 the insulin had had to be reduced to 5, 10 and 5 units. It was clear that there was a relation between the severity of the diarrhœa and of the hypoglycæmia; presumably owing to failure to absorb carbohydrate. The stools were greyish, with a fatty sheen suggesting the presence of fatty-acid crystals. On the history and these observations a diagnosis of gastro-colic fistula was made with some confidence.

Pathological and radiological examinations.—Blood: red cells 4,700,000; Hb. 75%; white cells 11,600; no abnormal cells. Serum-calcium 8·8 mg.; plasma-phosphorus 2·8 m.g.; blood-chloride 420 mg. per 100 c.cm. Fractional test-meal: some increase in free and total hydrochloric acid. Urinary diastase-index 10. Stools: total fat 59·3% of dried fæces, free fatty acid 23·9%, neutral fat 9·1%, soaps 26·3%.

Dr. E. E. Holdsworth reported the presence of a gastro-colic fistula after a barium enema, the results of a barium meal being inconclusive.

Preoperative treatment.—Since the patient appeared to be somewhat dehydrated and no reliance could be placed on his power of absorbing carbohydrate by mouth, it was decided to administer 150 g. of dextrose daily intravenously by slow drip, and to cover it with appropriate amounts of insulin. At 10 P.M. on May 11 infusion was begun, the solution consisting of three parts of 5% dextrose solution and one part of normal saline; the rate of flow was 30 drops per min., and 5 units of insulin was injected into the lumen of the tube near the cannula every 2 hrs. On the 13th the blood-sugar was 0·15 mg. at 11 A.M. The infusion was continued until 1.45 P.M. and the operation was begun at 2.30 P.M. Until that morning fluids were allowed freely by mouth in order to wash the stomach and intestine. The patient's general condition immediately prior to operation was good.

First operation.—Preliminary medication, 1 c.cm. of Omnopon and hyoscine (Roche); gas and oxygen anæsthesia. There was slight tissue œdema and a little clear fluid in the peritoneal cavity. At the site of the previous gastro-enterostomy there was a large anastomotic ulcer, adherent to the colon near the splenic flexure, which had ulcerated through into the colon. The colon and small intestine were clamped and dissected free, the anastomosis and fistula being opened. The edges of the opening into the stomach and the small and large intestine contained dense ulcer tissue which was cut away. The colon was repaired by transverse suture and a piece of omentum was stitched over the suture line. The edges of the openings in the stomach and small intestine were dissected free of ulcer tissue and the anastomosis was reconstituted. The patient stood the operation well and intestinal peristalsis continued throughout.

At 6 P.M. 200 c.cm. of 10% dextrose solution and 4 units of ordinary insulin were given intravenously and a similar amount at 9 P.M. On May 14 at 11 A.M. 250 c.cm. of 10% dextrose with 4 units of insulin were given intravenously and thereafter 3½ oz. of milk and 3½ oz. of water were given by mouth and 10 units of insulin were injected, followed by similar amounts 2-hourly with 2 units of insulin. On the 15th 7 oz. of milk with 6 units of insulin were given 4-hourly; thereafter solid food was added until, on May 21, he was receiving 2100 calories with ordinary insulin units 30, 25, 20. On the 28th analysis of stools showed total fat 36·5%, free fatty acid 4·9%, neutral fat 8·7%, soaps 22·9%. The total blood-calcium was 12·1 mg. and plasma-phosphorus 4·2 mg. per 100 c.cm. There was thus a substantial postoperative improvement in the condition of the bowel in relation to the absorption of fat, calcium and phosphorus. Recovery was uneventful, and the patient was discharged on June 8 on the same diet with insulin 20 units daily and zinc protamine insulin 30 units daily.

Progress.—After his discharge he felt well and was at work until the beginning of November, 1940, when one morning on his way to work he experienced severe mid-epigastric pain which then moved down to the umbilicus. The pain often recurred at irregular intervals not directly related to meals; it was relieved by food and alkalis. At times it radiated round to the back; it was aching in character and varied in intensity. There was no nausea and no vomiting. His diabetic condition remained unchanged, and he was stable on 20 units of zinc protamine with 20 units of ordinary insulin every morning. He was readmitted to hospital on Nov. 4, 1940. The sudden reappearance of the pain suggested that the repair operation had broken down. The stools were examined and showed a total-fat content of 31·2%, free fatty acid 11·36%, neutral fat 8·25%, fatty acids combined as soaps 11·6%. Blood: red cells 5,600,000; Hb. 96%; white cells 17,300 (polymorphs 71%). Thus, since May 28, the stools had become almost normal, and the red cell count normal, although no iron had been administered. Together these findings indicated considerable improvement in absorption. A barium enema was administered, and Dr. M. H. Jupe reported the presence of a gastro-entero-colic fistula.

In contrast with his condition on his first admission, he was in good general health, and little extra preparation was required before operation. On Dec. 2 he had his usual breakfast, with 10 units of ordinary insulin, and 10 units of zinc protamine insulin (half his usual dosage); he had his usual dinner, an easily digestible meal, at noon. At 2 P.M. his blood-sugar was 0·33 mg., and he received no further solid food; he was given 2 oz. of glucose in ½ pint of orangeade, with 4 units of insulin, at 2 P.M. followed every hour by a similar amount of orangeade and glucose until 10 P.M. In view of the high blood-sugar revealed at the 2 P.M. test, 12 units of insulin were given at 4 P.M.; blood-sugar at 5.30 P.M. was 0·29%, so a further 24 units of insulin was given at 8 P.M. Nothing but water was given by mouth after 10 P.M. At 9 A.M. on Dec. 3 the blood-sugar was 0·22 mg. An intravenous drip of 10% dextrose was given at the rate of 30 drops per min. until 2.30 P.M. Blood-sugar at 1·30 P.M. was 0·25 mg. This fulfilled our desire to maintain the value rather high in view of the anticipated severity of the operative measures necessary.

Second operation.—This was carried out at 3 P.M. Premedication was again 1 c.cm. of omnopon and hyoscine and the anæsthetic gas and oxygen. A mass of adhesions was found to be matting the splenic flexure of the colon to the posterior aspect of the previous gastro-enterostomy. The gastro-enterostomy was displayed by separating the adhesions. The adjacent portions of the gut forming the fistula were divided, exposing the lumens of the portions of the tract involved—the jejunum with a small part of the stomach and the splenic flexure of the colon. The colon was clamped with light clamps some distance from the opening, later two more clamps were applied closer to the hole. An ulcer could be palpated in the wall of the colon on the distal part of the splenic flexure, and resection was considered essential. Some 5 in. of colon were excised and with some difficulty the two ends of the bowel were brought together and an end-to-end anastomosis performed. The original gastro-enterostomy was repaired, the edges of the orifice were excised, and the edges sutured with continuous catgut and then inverted with a continuous seromuscular Lembert suture.

Immediately after the operation the patient showed signs of shock, and a pint of normal saline was administered intravenously followed by a pint of citrated blood. He rallied satisfactorily, and his subsequent progress was uneventful. The postoperative regime was similar to that after his first operation. A barium enema on Jan. 7, 1941, showed the colon to be large but without any defect in it. On Dec. 20 his serum-calcium was 10·4 mg. and serum-phosphorus 3·5 mg. per 100 c.cm. Blood-sugar estimations 2-hourly on the day before his discharge showed a slight nocturnal rise on 25 units of zinc protamine insulin and 10 units of ordinary insulin, so he was discharged on a dosage of 30 units zinc protamine insulin and 15 units of ordinary insulin each morning, his diet consisting of 2100 Calories. He was discharged on Jan. 18, 1941, having gained 13 lb. since his operation.

DISCUSSION

One seldom has an opportunity of treating a case of gastro-colic fistula so soon after its occurrence. Indeed, in this case, but for the concomitant diabetes and the consequent upset in insulin balance, it might have remained unsuspected for some time.

Various authors (Verbrugge 1925, Strauss 1921, Castle et al. 1930, Camp 1930, Poynton and Macgregor 1930, Fairley and Kilner 1931, Mindline and Rosenheim 1935, Benker and Hammett 1939, Bennett and Hardwick 1940) have drawn attention to the clinical features of the condition. The symptoms are usually those of ulceration, either simple or malignant, of the stomach followed in the former case by gastro-enterostomy and subsequent anastomotic ulcer, and in the latter by direct spread by intestinal ulceration. The patient may complain of foul eructations (in our case this symptom was elicited only by inquiry), of loss of weight although the appetite is good, and of diarrhœa, there being sometimes as many as 10–12 motions in the 24 hours. The bowels tend to act 2–3 hours after food and often at night. The changes in the stools (Strauss 1921) are an early feature. Fairley and Kilner (1931) have found that in both sprue and gastro-colic fistula there is usually excess of fat in the stools and that it is well split. In our case this was so before operation, but afterwards the stools returned to normal. Various other authors (Castle et al. 1930, Strauss 1921, Fairley 1930) have recognised the similarity between the findings in sprue and in gastro-colic fistula, and have noted a low blood-calcium and anæmia, usually megalocytic, in both; but in gastro-colic fistula there is usually a high gastric acidity while hypochlorhydria is usual in sprue. Our patient had a moderate hypochromic anæmia with no abnormal cells; this disappeared after operation without any iron other than in the food; gastric analysis showed hyperchlorhydria.

The importance of radiographic examination was emphasised by Strauss (1921) who said that gastro-colic fistula may sometimes be discernible only by barium enema. This was confirmed in our case, for the barium meal was indeterminate, whereas the enema left no room for doubt, and on the second admission a clear result was obtained by enema alone.

We would call attention to the ease and convenience of the continuous infusion of dextrose in fairly large amounts, together with insulin injections, as means of securing a satisfactory blood-sugar level with complete absence of ketosis. The solution used was not normal saline solution with added dextrose, which would have tended to raise the salt content of the body unduly, but normal saline mixed with either 5 or 10% dextrose in water so as to form an isotonic solution.

Our thanks are due to Dr. Greenfield and his staff for the biochemical estimations.

References at foot of next page

A CASE OF POLYRADICULONEURITIS

WALLACE BRIGDEN, M.B. CAMB.
LATELY HOUSE-PHYSICIAN AT SUTTON EMERGENCY HOSPITAL

THE case of polyradiculoneuritis described here made an unusually rapid recovery. The disease appeared to be intermediate in type between the acute febrile form of Holmes and the Guillain-Barré syndrome as exemplified in the East Anglian epidemic described by Stuart Barber.[1]

A previously healthy, well-nourished man, aged 30. A fortnight before his first nervous symptoms he had a sore throat which he believes was unaccompanied by fever; from this he recovered in a few days. Weakness and pain in the calf muscles, followed rapidly by numbness and weakness in the arms, heralded the paralytic stage. Walking became impossible 3 days later. He was then admitted to hospital and was found to have reduced power in both arms, the left being more affected than the right. With the exception of the right triceps jerk all tendon reflexes were absent. Thoracic muscles were normal, but the superficial abdominal reflexes were absent. Both legs were in flaccid paralysis with all tendon reflexes absent, but the plantar reflexes were extensor. His calf muscles were tender. There was no proprioception from great toe movement, and some loss of epicritic sensation over a small area on the lateral aspects of both ankles; otherwise sensation was unimpaired. There was persistent tachycardia and slight enlargement of the heart. The cerebrospinal fluid was under pressure, and showed considerable rise in protein and no increase in cells. The Wassermann reaction was negative. During the next 3 days the facial muscles and recti abdominis, except in the right upper quadrant, became completely paralysed and speech was slurred, and on the fourth day it was noted that the left lower intercostals were involved. Blood-sedimentation rate 73 mm. in 1 hour. White cells 12,200 (polymorphs 77%, lymphocytes 18%). This marked the maximum extent of the paralytic process, which remained stationary for a further week, at the end of which the B.S.R. had improved to 56 mm. in 1 hour, and white count to 11,200 (polymorphs 69%, lymphocytes 30%). From this time the facial and intercostal muscles regained normal power in about a fortnight, while there was a general improvement in muscle tone; for some days stroking the sole produced a flexor response of the whole limb with extended toes. During this recovery phase the B.S.R. progressively fell, by the end of the fourth week reaching only 12 mm. in 1 hour; the white blood-cells were now 6000 (polymorphs 64%, lymphocytes 33%). In the next few days the abdominal muscles regained their power, the hamstrings and recti femora became almost normal, and proprioception returned. Tachycardia subsided during the fifth week. Seven weeks after admission he was able to stand and no signs of abnormality in the nervous system other than an indefinite plantar response on the left side were obtainable. Normal walking soon followed. B.S.R. fell to within normal limits, but there was a slight unexplained rise in leucocytes.

Intramuscular injections of 10,000 units of vitamin B_1 were administered daily for 10 days, and a third of this dose for a further 10 days. No indications of vitamin deficiency existed before his illness, and it is doubtful whether this treatment helped in his rapid recovery. Physiotherapy was given to the limbs for 2 weeks before he began to walk.

In this patient the pathological process spread from the motor roots and anterior-horn region to involve the upper motor neurone, and in view of the slight sensory impairment other tracts were possibly also affected. The rapidity of recovery suggests that the condition was due to no more than an inflammatory œdema or the diffusion of a locally produced toxin. The raised B.S.R. and leucocytosis favour the infective theories of its origin, but differ from the findings in Stuart Barber's cases; resemblance was found on examination of the C.S.F. In other cases reported the B.S.R. was either normal or not investigated. This man responded well to the unknown noxious agent; this probably produces a generalised metabolic disturbance of which paresis may be only one aspect. The intensity of the patient's response may have been related to the rapidity and completeness of his recovery.

I am indebted to Dr. Louis Minski for permission to report the case.

1. *Lancet*, 1940, **2**, 548. The differential diagnosis, ætiology and pathology of the disease are discussed in Barber's paper.

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Reviews of Books

Doctor and Difficult Child

WILLIAM MOODIE, M.D. St. And., F.R.C.P., D.P.M., medical director, London Child Guidance Clinic and Training Centre. London: Humphrey Milford, Oxford University Press. Pp. 214. 8s. 6d.

THE Commonwealth Fund of America is to be congratulated on this publication; in these days of shortage and "ersatz" it is a joy to get hold of a book so beautifully bound and printed. Nor are the contents less pleasing; from his vantage as a pioneer of child psychiatry in this country, Dr. Moodie has surveyed the whole range of problems which a child is likely to present to its harassed parents or teachers. The book could be used as a manual of practical advice, not only to doctors, but to anyone who deals with children and their problems. The author has all the good Scots belief in hard work and sound education, and the danger is that the tyro may suppose that it is all as easy as it looks. "The education of neurotic or so-called 'nervous children' needs special care," says Dr. Moodie. "They require to be kept interested and encouraged to make an effort. They must not, on any account, be driven. Education has special value for them because it utilises the mental energy which is behind their nervous symptoms, and at the same time it gives them things to think about and so directs their thoughts from themselves and their fears." But having led the horse to water, how to make him drink? Mechanisms are not dealt with in detail, and the book should be read less as a textbook in child psychiatry than as a pleasant account of the way in which many problems in childhood can be sensibly approached and satisfactorily treated.

Practical Biochemistry for Students of Medicine

(4th ed.) A. T. CAMERON, D.Sc. Edin., F.R.S.C., and FRANK D. WHITE, Ph.D. Edin. London: J. and A. Churchill. Pp. 246. 9s. 6d.

FIVE years separate the new edition of this approved Manitoba manual from the previous one; but the authors have made but few innovations, preferring, as they state, to keep the old tested methods as far as possible. However, an account of the micro-Kjeldahl estimation has been introduced, and also the estimation of ascorbic acid and Fearon's test for citrulline. A possible weakness of this book is the rather scanty section on the blood pigments; while for the estimation of phosphate in urine the use of cochineal as internal indicator might be preferred to the external use of ferrocyanide. Strong points are the excellent section on alkali reserve, the introduction to liver function tests, vitamins and hormones, and the instructions for the handling and standardisation of quantitative apparatus.

Catechism Series: Surgery

(5th ed.). Edinburgh: E. and S. Livingstone. Pp. 70. In two parts, each 1s. 6d.

Part 1 deals with the general aspects of surgery such as infections, hæmorrhage, shock and gangrene, and diseases of bone. Part 2 embraces fractures, dislocations and diseases of joints. It is surprising what a wealth of information is contained in these necessarily compressed accounts; and for what they are—unashamedly examination cram-books—these slight volumes are commendably up to date and informative. The introduction of X-ray photographs is a useful new feature; most of these have reproduced sufficiently well to be of value to the student but some (notably Paget's disease of the tibia and the benign giant-cell tumour) should be strengthened or replaced in the next edition.

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THE LANCET

LONDON: SATURDAY, OCTOBER 18, 1941

HOSPITALS FIRST

ON Thursday of last week, in reply to a question in the House of Commons (see p. 466), the Minister of Health outlined the Government policy on the hospital service after the war. It is the objective of the Government, he said, to ensure that appropriate treatment shall be readily available to every person in need of it. This task will be laid on the major local authorities, whose duty it will be to secure a comprehensive service by placing on a more regular footing their existing partnership with the voluntary hospitals. But the design of the service is to be based on areas larger than counties and county boroughs, in order to include in each a teaching hospital or other such centre in which the more highly specialised services can be provided. Patients will be expected to make a reasonable payment, whether by contributory schemes or otherwise, towards the cost of their treatment, the remainder being borne by the local authority or the voluntary hospital with the assistance of an Exchequer contribution. Teaching hospitals are to have increased educational grants. Such in broad outline is to be the sequel to the Emergency Hospital Scheme which came into being just two years ago. It will not surprise those who have read the PEP report of December, 1937 ("The hospital problem is essentially regional . . ."), or have followed attentively the devoted labours of the Nuffield Provincial Hospitals Trust, with Sir FARQUHAR BUZZARD as adviser, which have familiarised the country with a scheme of hospital reorganisation based on regional units. Mr. ERNEST BROWN in announcing his project for an immediate survey of hospitals in Greater London acknowledges the valuable preliminary work done by the trust outside the metropolis. He spoke of three stages in orderly progress: consultation between all concerned, which has already taken place; then the survey; and afterwards the working out of the scheme—"of course," he added, "with the approval of the Ministry." But he did not specify who is to control the new regionalised hospital scheme—no doubt the right sort of independent corporation will be found when the time comes—and he flatly declined to consider a general national health service or the future of the medical profession as a whole; "that is," he said, "of course a wider question, and the hospital service must be considered first."

There are several reasons why the course of post-war hospital policy may be smoother than could have been foretold two years ago. The state, as Mr. C. E. A. BEDWELL reminds us,[1] has now undertaken to replace the damage done to parent hospitals by air-raids, and the satellite hutments of 1939–41 are more attractive than those of 1914–18 with the result that "patients like them." Some recent voluntary hospitals have cost £1000 or more a bed, but a 40-bed hutment can be provided for £70 a bed. One world-famous British hospital spent its first thirty years happily in the hutments of an even earlier war-period. Mr. BEDWELL, reviewing the ground covered by the PEP report, speaks of the "silent revolution" in the hospital service effected by the Local Government Act of 1929. Under its de-rating clauses the million sterling grant from the Exchequer to voluntary hospitals (promised in 1924 and later repudiated) was more than handed over to the county councils to help them meet their dual obligation: to provide hospital beds for all, and in so doing to consult the voluntary authorities. Since then the hospital wagon has been drawn by a team which begins to look like a span. Following London's admirable example, under the tutelage of Sir FREDERICK MENZIES, local authorities all over the country are increasing their payments to voluntary hospitals for services rendered, under a wide variety of agreements; in the darkening valley their paths have drawn closer during the last two years. The ideal area for hospital administration is also the ideal one for all sorts of public-health work and presumably for other large-scale public activities. That conviction, stated in these columns [2] when the Ministry of Health began to intervene, has only been strengthened by what has happened since. But it may well be true, as Mr. BEDWELL suggests, that local authorities might be more easily reconciled to the surrender of their hospital control to a regional authority if they could retain their general care of the public health, for which a personal knowledge of the needs of the people and of their manner of living is essential. At all events Hospitals First is the watchword, and we may be well content that the Government has committed itself to consultation, survey, preparation and settlement of a comprehensive scheme.

1. *Quarterly Review*, October, 1941.

LYSOZYME

IN spite of the successes of the sulphonamides and acridines, and lately of penicillin, the demand for local antiseptics is not yet satisfied. For some years the Russians have been investigating the possibilities of lysozyme. FLEMING,[3] its discoverer, gave this name to a class of enzymes possessing the power of dissolving a variety of micro-organisms. These enzymes are almost universally distributed in animal tissues and body fluids. They are found particularly in saliva, serum and tears, and, of the solid tissues, cartilage, but curiously enough they are absent from the cerebro-spinal fluid. High concentrations are found in white of egg. Pure lysozyme was isolated by ROBERTS [4] and crystallised by ABRAHAM and ROBINSON [5]; it is a readily diffusible protein of low molecular weight which is rather more soluble in fats and oils than in saline and water. FLEMING clearly established that its physical properties were those of an enzyme. It is not, for instance, used up in the course of bacteriolysis; it operates on bacteria over a narrow range of pH in the neighbourhood of neutrality, and it is inactivated in neutral or alkaline solution by moderate heat. The substrate of lysozyme (the substance on which it acts) was thought by HALLAUER [6] to be a glyco-protein, while MEYER and his colleagues [7] showed that reducing sugars were split off from the bacterial substrate during the course of digestion.

2. *Lancet*, 1939, **2**, 939.
3. *Proc. roy. Soc.* B, 1922, **93**, 306; *Lancet*, 1929, **1**, 217.
4. *Quart. J. exp. Physiol.* 1937, **27**, 89.
5. *Nature*, 1937, **140**, 24.
6. *Zbl. Bakt.* 1929, **119**, 240.
7. *J. biol. Chem.* 1936, **113**, 303.

These facts were reconciled by EPSTEIN and CHAIN,[8] who showed that lysozyme, like "spreading factor," is a carbohydrase, and that lysis of bacteria takes place when the products of hydrolysis, like the purified substrate, are soluble in water. It is probable that the substrate has protein attachments in the bacterial envelope, and that lysis in addition to antisepsis—an important distinction first made by EPSTEIN and CHAIN—occurs only when the conditions of digestion are such that the bacterial proteins dissolve in the digestion fluid. Thus, as NAKAMURA[9] first observed, a mere adjustment of pH may bring about the "flash lysis" of bacteria which are structurally unaffected by the enzyme.

There are serological differences between samples of lysozyme from different sources,[10] but all alike digest the purified substrate in vitro. The test organism since universally used for examining the action of lysozyme was isolated by FLEMING from nasal mucus and named by him *Micrococcus lysodeikticus*. He found that three-quarters of more than 100 airborne microbes studied, including bacilli, yeasts and moulds as well as cocci, were susceptible to lysozyme; but some classes of bacteria, notably the coli-typhoid group, are totally resistant to its action. A striking fact is that *Brucella abortus* and *Bacillus pseudotuberculosis rodentium* are moderately susceptible: these, FLEMING writes, "are culturally and serologically identical with *Micrococcus melitensis* and *B. pestis* respectively, both of which . . . are very pathogenic for man, and for which there is apparently no lysozyme in the human secretions. It may be that it is in this sensitiveness to a human lysozyme that the difference between these microbes lies." Unfortunately it is chiefly, though not entirely, on the non-pathogenic organisms that lysozyme acts; the determining factor, EPSTEIN and CHAIN point out, is whether or no the enzyme substrate is present in the bacteria. *B. anthracis*, for instance, is destroyed though not dissolved by lysozyme. Many organisms may in fact be non-pathogenic because of their susceptibility to lysozyme. Moreover, FLEMING found that by exposure to lysozyme bacteria may acquire, and maintain during cultivation, a resistance to its action. Thus RIDLEY observed that lysozyme-resistant survivors from an originally innocuous strain of staphylococci had acquired, with their resistance, the power of producing keratitis when injected into the cornea of rabbits.

There are, then, serious limitations to the powers of lysozyme as an antiseptic, and there is still another difficulty to be faced if lysozyme is to be given by injection or applied to raw vascular surfaces. This is that in such circumstances lysozyme will act as an antigen, and the recipient may find himself sensitised to the foodstuffs which contain the enzyme. So far egg-white has been the only practicable source of lysozyme in quantity. Treatment with this "foreign" lysozyme might sensitise the patient to eggs, though not to other animal foodstuffs since their lysozyme is serologically different, and the antigenic effect would not be destroyed by ordinary cooking. This objection, however, will not apply to the application of lysozyme to the eye or unbroken serous surfaces.

For the last ten years YERMOLJEVA, BUJANSKAVA and their colleagues in Russia have been examining the possibility of using lysozyme in surgery. In the short review[11] they published in 1938, before purified lysozyme was available for their use, they reported encouraging results in the treatment of corneal ulcers, in the general surgery of the eye and elsewhere. How far these applications can usefully be extended remains to be seen.

HEALTH AND THE JOB

DOCTORS are usually fair-minded people but if their outlook has a bias it may be said that it points naturally and justifiably, like the needle of a compass, towards the interests of their patients; for when someone comes for help and advice it would only be a churlish fellow who did not respond to the compliment and do his best. Not all doctors, however, realise the weight that medical certificates carry nor how great an influence the medical profession in the aggregate can exert on the war effort. Workpeople know that doctors are ready to help them in their troubles and they are accustomed to seek medical certificates to support their physical and psychological objections to doing night work, an unpleasant job, or working in a particular factory controlled by the Essential Work Order. Many such objections and applications are genuine and the medical certificates are rightly issued after adequate deliberation by the medical men. If however the doctor states, in good faith but without first-hand knowledge, that the factory conditions or processes are detrimental to the worker's health, his certificate goes beyond his experience. In the Sheffield district, for example, the process of grinding has a bad name because the dust from the sandstones which were used in the past gave rise to grinders' rot or silicosis. Nowadays nearly all sandstones have been replaced by artificial abrasive wheels made of non-siliceous materials and grinders on the whole are no longer exposed to the risk of silicosis. Other processes go by the name of grinding such as "precision grinding" in the manufacture of machine tools. The grinding is often done by a diamond point from which little or no dust arises, and in all cases the work is either done wet or under exhaust ventilation. But in Sheffield grinding is still grinding (in the same way as pigs is pigs whether guinea or otherwise) and therefore dangerous to health—and this folk-lore is apt to be reflected in doctors' certificates. Such lack of knowledge or discrimination, if it is not checked, can have a deleterious influence on the output of essential war material. On another page a letter from a works manager illustrates this point.

When a doctor is confronted by a worker who asks for a medical certificate stating that his work is endangering his health, he would do well to bear in mind that such a certificate cannot justifiably be given unless he knows both the worker's state of health and the conditions of his work. The doctor can take his choice between going to look at the job the worker has been doing, getting in touch with the works medical officer (if there is one) and discussing the case with him, or consulting one of H.M. medical inspectors of factories who are stationed in London, Birmingham, Bristol, Sheffield, Leeds, Manchester and Glasgow,

8. *Brit. J. exp. Path.* 1940, **21**, 339.
9. *Z. ImmunForsch.* 1923, **38**, 425.
10. Roberts, E. A. H., Macgraith, B. G. and Florey, H. W. *Quart. J. exp. Physiol.* 1938, **27**, 381.
11. *Acta med. U.R.S.S.* 1938, **1**, 248.

and are always ready to advise on occupational health risks in general or on the processes of a particular factory.

TEMPORARY IMMUNITY AGAINST INFLUENZA

WHILE we await the development of a trustworthy method of active immunisation against influenza, the temporary protection conferred by immune sera is not necessarily to be despised. Such evidence as there is suggests that the prospects of achieving a local passive immunity are hopeful. SMORODINTSEFF [1] reported promising results from the inhalation of finely dispersed immune horse-serum, but full details are not available. TAYLOR [2] has lately described the results of experimental studies on influenza A virus infection of mice. A single dose of immune ferret serum administered intranasally to mice protected them against virus introduced by the same route 24 hours later; even after 48 hours some protection was given. Serum applied intranasally after virus infection achieved much less, but there was a definite effect if the interval between infection and administration of serum was not greater than 6 hours. Intranasal serum was in all experiments far more effective than intraperitoneal, apparently because it achieved a high antibody concentration at the spot where it was most needed. There must be some danger from producing sensitisation by administering foreign sera intranasally to human beings, but convalescent human sera should be available quite early in an epidemic and methods of quickly estimating the potency of these are known. Even temporary protection of key persons would often be worth while. For instance, as often happens, if father and the children are all down with the 'flu and mother is looking after them, much would be gained if she could be protected during the difficult period by sniffing antibody once or twice daily. But further work is needed to establish that TAYLOR'S findings can be applied to war, and it has yet to be decided whether the effect could be best achieved by instillation of liquid or by using snuff or a fine spray. A great attraction of the sniffing technique is that it could be applied not only to influenza A—the variety of influenza most troublesome in recent years—but perhaps to other virus infections also. It may be that pandemic influenza is due to neither of the known viruses, A and B. We may one day be faced with a devastating scourge such as that of 1918–19, with little hope that laboratory studies can provide a remedy in time. Prophylactic application of convalescent serum to the nasal passages might then prove a godsend, capable of being put into effect even by those isolated from centrally organised help.

1. Smorodintseff, A. A. *Proc. 3rd int. Congr. Microbiol.* 1939, p. 375.
2. Taylor, R. M. *J. Immunol.* 1941, **41**, 453.

THE new crop of war-blinded are reaching St. Dunstan's. Captain Sir Ian Fraser, chairman of the executive council, finds them more serious minded than their forerunners of the last generation. They are quick learners in walking about wards and classrooms, and many have already passed the exacting tests in braille reading and typewriting expected of them, and have begun to share in the indoor and outdoor games and recreations open to them, including cards, dominoes, tug-of-war, rowing, tandem cycling (presumably with a seeing partner), acting, music and dancing. "Recovery of sight," Sir Ian writes in the twenty-sixth annual report, "is impossible for many, but recovery from blindness is the rule."

Annotations

SOURCES OF VITAMIN C

ONE of the most striking changes in our diet since war began has been the fall in the consumption of fruits. Few raspberries, strawberries and blackcurrants have been obtainable this summer outside the districts where they are grown, and the large supplies of fruit which could normally be expected for winter and spring—oranges, lemons, grapefruit, bananas and the wide variety of canned fruits—have been greatly restricted.[1] These fruits are mainly of dietetic importance for their vitamin-C content. Holmes, Pigott and Tripp [2] point out that, on an average, 110 ml. of orange, grapefruit or lemon juice will supply the 50 mg. of ascorbic acid which the adult probably requires daily. The importance of these citrus fruits in normal times lies not only in their high antiscorbutic value but also in their relatively low cost as sources of vitamin C,[3] and alternative cheap sources of the vitamin are therefore needed. Andross [4] has collected some useful information on the vitamin-C value of wild fruits, and has tested jams, juices and puree made from wild rose hips, elderberries, wild raspberries, cranberries, bilberries and crab-apples. Of these fruits wild rose hips alone seem to be worthy of practical consideration as antiscorbutics. Pezold [5] in Germany quotes values ranging from 500 to 1100 mg. of ascorbic acid per 100 g. of wild rose fruit. He also discusses the effect of various methods of presenting hips in an edible form and urges the importance of picking the fruit before they are over-ripe when they lose something like half of their vitamin-C content. He considers that during the winter months responsibility for vitamin-C intake must lie largely with the jam manufacturer, for he found that jam is one of the most effective ways of preserving the hips. He also strongly recommends hip wine, but this might be an impractical suggestion for this country where the commercial preparation of fruit wines is not so common as in Germany. Here the housewife has been rediscovering the tastiness of hip marmalade and hip jelly, and hips are being collected on a large scale by women's institutes, schools, boy scouts and girl guides. It is hoped to convert some 500 tons into syrup. The picking organisations are to receive 2*s.* per 14 lb. for the fruit, so that it should be possible to sell the syrup at a reasonable price. Among our cultivated fruits we have a rich source of vitamin C in blackcurrants, and the Ministries of Food and Health have reserved a significant proportion of this year's crop in the form of puree and juice for young children. But the supply of vitamin C for older children and for adults too must be considered. Olliver [6] reports that, in the spring of this year, cooked green vegetables provided almost all the vitamin C in the diet of test subjects, and that one 4 oz. helping of freshly cooked green vegetables could supply the total daily requirement of the vitamin. Root vegetables, such as potatoes, may be valuable antiscorbutics when freshly harvested, but are poor sources of the vitamin in the spring owing to loss on storage. The consumption of green vegetables in the late winter and spring is obviously to be encouraged, provided the material is properly handled. Olliver's experimental work emphasises the need for the careful cooking of vegetables and shows that about half the vitamin C is destroyed after the vegetables have been kept hot for only 40 minutes. These results, together with the recent summary by the Medical Research Council [7] of the best methods of preparing

1. *See* Widdowson, E. M. and Alington, B. K. *Lancet*, Sept. 27, 1941, p. 361.
2. Holmes, A. D., Pigott, M. G. and Tripp, T. *New Engl. J. Med.* 1941, **225**, 68.
3. Olliver, M. *Lancet*, 1940, **2**, 190.
4. Andross, M. *Analyst*, 1941, **66**, 358.
5. Pezold, F. *Dtsch. med. Wschr.* 1941, **133**, 897.
6. *J. Soc. chem. Ind. Lond.* 1941, **60**, 586.
7. *Lancet*, 1941, **1**, 838.

green vegetables for the table, should be impressed on housewives and caterers, and especially those who are responsible for feeding large numbers of children.

PELLAGRA IN SPAIN

THE unhappy Spanish war led to malnutrition of which the extent can be inferred from the numerous clinical papers on vitamin deficiency in Iberian journals. Thus in the second number of the new *Acta Española Neurologica y Psiquiatrica* there are three articles based on only too rich an experience. B. Llopis has studied 118 cases of psychosis due to pellagra, from the initial to the final stages; he reports endogenous as well as organic syndromes, and has observed four stages in the disorder—neurasthenia, apathy, oneiroid confusion and, finally, profound disturbance of consciousness, which are respectively akin in his judgment to mental fatigue, going to sleep, light sleep and deep sleep. The psychological content of these syndromes is derived from organic disturbances of sensation, which are localised, and the translation of which into hallucinations can be clearly traced in the patients, facilitated as it appears to be by the clouding of their consciousness. Llopis devotes the greater part of his paper to a review of the significance of this for psychopathology. From Madrid, J. Marquez Blasco and M. Peraita contribute two papers on the capillaries and the skin temperature in this disorder. During the autumn and winter of 1937, they state, a great part of the civil population of Madrid showed a syndrome, essentially of pellagrous nature, characterised chiefly by paræsthesiæ; a smaller group, more gravely affected, showed the "rich and singular symptomatology" of a pellagra syndrome in which burning pain, similar to causalgia, was prominent. The authors decided therefore to see what part the capillary system played in these causalgia-like phenomena; they used the clinical material of Llopis, and of Jimenez Garcia, as well as Peraita's own cases—56 in all, with neurological disturbances in all but 6. Absolutely normal capillaroscopic findings were never found, but 54% of the cases were in the main normal in this respect, and in 18% the picture was quite abnormal. The capillary changes increased as the illness went on, and were related to neurovegetative disturbances. There did not appear to be any connexion between the type of capillary anomalies and the presence or absence of cutaneous and mental symptoms. They found, in 40 subjects whose cutaneous temperature was measured, that there were in the extremities many departures from the normal (the readings being lower, as was to be expected from the frequency with which these patients complained of coldness in the extremities) whereas in proximal zones, such as the forehead, normal readings were obtained. The vasomotor control was investigated in 6 of the cases and in 5 of them judged abnormal, the response to immersion of the arm in warm water being either delayed or incomplete.

CYCLICAL CHANGES IN HUMAN ENDOMETRIUM

THE unique activities of the glandular cells of the endometrium during the menstrual cycle have been further investigated in Dublin by O. E. Aykróyd and J. Brontë Gatenby.[1] Taking advantage of recent advances in histological technique they have been able to show a remarkable series of changes in the Golgi apparatus and paraplasmic inclusions, corresponding to different phases in the cycle, which they divide into the proliferative, progravid, menstrual and postmenstrual periods. At menstruation the Golgi apparatus suddenly disperses while much of the cell contents is thrown into the lumen. But the Golgi apparatus of the basalis portion of the endometrium, which is not shed, undergoes a similar change. During recovery the fragments of Golgi apparatus are gathered into a transverse line parallel with the free margin of the cell, producing thus a palisade effect when a row of cells is viewed, though there is no evidence of any intercellular connexion between adjacent pieces of the apparatus. During the proliferative phase (lasting from the fifth or sixth day to the fourteenth day after menstruation) the Golgi apparatus reforms into the usual net-like arrangement lying near the nucleus and remains thus for the remainder of the cycle. In this proliferative phase no sudanophil fat is found within the cells, but droplets appear on a small scale early in the progravid phase (fifteenth to twenty-eighth day) and thereafter increase. This fat becomes greatly exaggerated if pregnancy supervenes; in menstruation it is shed into the lumen. These changes in the Golgi apparatus are interpreted by Aykroyd and Gatenby as representing the preparation of the apparatus for the active production of a solid, probably proteid, secretion related to early pregnancy. This secretion, appearing in the form of cytoplasmic droplets stainable with Heidenhain's iron hæmatoxylin, is increased in the cells in early pregnancy and is a feature of diagnostic help in the histological examination of curettings from a suspected case of interrupted pregnancy. The physiological significance of this secretion seems to be unknown. It would be useful to know if it is also present in association with other conditions giving a positive Aschheim-Zondek test.

1. *Quart. J. micr. Sci.* June, 1941, p. 541.

CHEMOTHERAPY IN TUBERCULOSIS

SUBSTANCES which have been administered to the long-suffering patient in the vain hope that they would destroy the tubercle bacillus without first destroying him are enumerated by Calmette as follows: salts of calcium, gold, silver, bismuth, copper, and the rare earths of the ceric group; formic aldehyde, benzyl alcohol, xylol and the creosote series, iodine and its compounds, dyestuffs, and the fatty acids of chaulmoogra and cod-liver oil. Even this list is by no means complete. Gold has had the best press, and still has its disciples—and martyrs. During the last five years a new school has arisen, as was inevitable, to try out the sulphonamides, and a large number of papers has been published recording experiences of administrations to patients and experiments in vivo with laboratory animals and in vitro with various strains of tubercle bacillus on different culture media. Lately Feldman and Hinshaw[1] in America have noted a definite modification and retardation of the expected course and character of experimental tuberculosis in guineapigs receiving sulphapyridine, though they encountered unpleasant results on the mucosa of the digestive tract. Feldman and Karlson[2] also tested it on rabbits infected with avian tubercle bacilli, but with unsuccessful results. Heise and Steenken[3] encountered similar disappointments with guineapigs, and noted that the growth of the tubercle bacilli was not entirely inhibited by sulphapyridine introduced into the culture media even in concentrations of 80 mg. per 100 c.cm. Flippen, Forrester and Fitz-Hugh[4] confirmed these negative findings, and it looks as though another chapter of failures has been closed. A variant of these chemotherapeutic experiments has been made by controlling the oxygen. Saz and Bernheim[5] set out to find a substance which would inhibit extra oxygen intake, the drug known as 2:3:5-triiodobenzoate being selected. With this compound in very low concentration inhibition of growth was obtained on culture media. It is tolerated by rats and guineapigs, and man can take it by mouth without apparent ill effects—and absorb it from his gastro-intestinal tract. Apparently it can inhibit growth without destroying cells. The difficulties of all this work are obvious. Not only is the chemo-

1. Feldman, W. H. and Hinshaw, H. C. *Amer. Rev. Tubere.* 1940, **41**, 732.
2. Karlson, A. G. and Feldman. *Ibid*, 1940, **42**, 146.
3. Heise, F. H. and Steenken, W. jun. *Ibid*, p. 801.
4. Flippin, H. F., Forrester, J. S. and Fitz-Hugh, T. jun. *Ibid*, p. 821.
5. Saz, A. K. and Bernheim, F. *Science*, 1941, **93**, 622.

therapist faced with the task of damaging the bacilli without damaging tissue cells, which is common to all work of this kind, but he has to encounter two additional obstacles. In the first place the histological tubercle is avascular, and quite early in its development has a zone of protective collagenous fibres around it. Secondly, the waxy envelope of the tubercle bacilli is a law unto itself. Even in a test-tube it is difficult to destroy, and attempts to do so in living tissues, with drugs of known potency in capsule destruction, such as sulphapyridine, have not been conspicuously successful. A new method of approaching the problem has now been devised by Emmart and Smith,[6] with an ingenious technique for cultivating the tubercle bacillus on the chorio-allantoic membrane of the chick embryo. In this way they are able to obtain tubercles within 4–6 days of implantation, and to make cytological studies of the reactions to the different cultures used. This method may enable the chemotherapist to obtain what he has long been wanting —a rapid picture of the tissue reaction to a drug in tuberculosis.

"SPONTANEOUS" RUPTURE OF THE SPLEEN

THERE have been about 20 reports in the last 20 years of spontaneous rupture of the normal spleen, and though not all of them bear scrutiny there are a few careful records under this self-contradictory title. Rupture of the spleen is a known if rare complication of malaria and typhus fever and it is not unknown in typhoid or indeed in almost any disease where the spleen is enlarged. In this country it is usually caused by trauma and the aeroplane and motor-car have done much to increase its incidence. Of more immediate interest are those instances of delayed rupture where a patient receives a blow but after a short time appears normal and may even return to work only to collapse several hours or days later with serious internal bleeding. The cause of delayed rupture is not certain but it is believed that the original splenic tear is quickly sealed by coagulation or omentum and that the bleeding starts again when this plug is dislodged. Another possibility is that the original injury produces a subcapsular hæmatoma with subsequent pressure necrosis, softening of the pulp and erosion of fresh and large vessels. In spontaneous rupture such delayed effects of trauma must be excluded and adequate histological examination of the spleen must be made before the diagnosis can pass muster. Thus King's[7] case-report of spontaneous rupture in infectious mononucleosis, which contains one of the few detailed descriptions of the pathological findings in that disease, is not in the accepted sense spontaneous since the spleen was greatly enlarged. In Hamilton Bailey's[8] list of 11 recorded cases it is noted that in 4 no microscopical examination of the spleen was made, and in 1 it was said to be apparently normal. Nor is it wise to stake all on a casual or even a categoric denial by the patient of a blow and Hamilton Bailey's view that the spleen cannot be ruptured without the patient remembering the knock is certainly open to question. Workers in industry often receive blows which are capable of causing grave injury but are quickly forgotten if they do not involve immediate incapacity for work. The time factor is important and a case-record by Hohenwallner[9] opens the question of just how long a delayed rupture of the spleen may be delayed. Hohenwallner's patient was struck on the chest on Sept. 2 but after a short rest he recovered and went on working until Jan. 3 when he was found to have abdominal bleeding from an old tear in the upper pole of the spleen. That the injury received four months previously caused the rupture and the later illness seems evident and the implications both to the practice of traumatic surgery and to the theory of spontaneous rupture are obvious. It may be that sometimes neither trauma nor any known change in structure plays a part in the so-called spontaneous rupture of the spleen but if the cause is unknown it is better to avoid euphemistic terms like "spontaneous" and say so plainly when we do not know.

6. Emmart, E. W. and Smith, M. *Publ. Hlth Rep. Wash.* 1941, **56**, 1277.
7. King, R. B. *New Engl. J. med.* 1941, **224**, 1058.
8. Bailey, H. *Brit. J. Surg.* 1930, **17**, 417.
9. Hohenwallner, J. *Zbl. Chir.* 1938, **68**, 1910.

AN APPOINTMENT IN SUSPENSE

THE Dudley town council has affirmed by 15 votes to 13 its decision to suspend its medical officer of health, Dr. W. A. McLennan, for the duration of the war. Its sole reason is that, being obliged by law to register for military service, Dr. McLennan registered as a conscientious objector in the manner prescribed by law. There is no suggestion that he is incompetent; on the contrary, his efficiency has been publicly acknowledged. The Government, and indeed the Minister of Labour and National Service himself, long ago deprecated any victimisation of those whose conscience leads them to follow a course which the law expressly permits. The borough is depriving itself of a key officer of recognised ability and experience at a moment when these qualifications are particularly important and when replacement must be made from a limited field and from relatively inexperienced applicants. It can hardly be supposed that this aspect of the most profitable use of medical man-power can have escaped the attention of the Minister of Health. It is understood, however, that he has hitherto found himself unable to convey to the town council of Dudley any suggestion that its decision should be reconsidered.

UROLOGICAL COMPLICATIONS OF CERVICAL CARCINOMA

ALL gynæcological textbooks lay emphasis on urological complications as a cause of death in carcinoma of the cervix, but a thorough urological investigation is often omitted in such cases except when obvious symptoms focus the surgeon's attention on the urinary tract. Anatomically, this tract is most vulnerable to carcinoma of the cervix in its lower reaches—in the bladder and the pelvic portions of the ureter, notably where they traverse the base of the broad ligament. Lesions of the urethra, the abdominal part of the ureter, or the kidney are secondary findings caused either by advanced malignancy or by back pressure from ureteric obstruction. Renal metastasis is rare, and was seen only once by T. F. Todd[1] among over 1000 cases of carcinoma cervicis. The incidence of involvement of the lower urinary tract can be judged from his statement that he saw bladder involvement in 110 cases at their first attendance; whereas the rectum, that other close neighbour of the cervix, was involved only once in all cases prior to treatment. The growth first invades the muscle wall, causing circulatory changes in the mucosa, and next spreads forwards into the mucosa, finally ulcerating and producing a vesico-vaginal fistula. Cystoscopy, and cystoscopy alone, can diagnose these bladder changes in their early stages. The mucosa is at first congested and distorted; there is transverse ridging of the base of the bladder, with isolated hillock formation, and later bullous œdema and finally ulceration. These last two phenomena place the patient in stage IV of the League of Nations classification. The importance of this cystoscopic examination is that in 195 cases clinically assessed as stage III no less than 44 showed involvement of the bladder in Todd's series—a clinical error of 20%. The prognosis in these cases is thus gravely affected by the urological investigation. It is not, however, only as a diagnostic and prognostic procedure that cystoscopy is of value, but also in the urological complications of treatment. These are twofold: recurrent malignant disease in the bladder,

1. *J. Obstet. Gynæc.* June, 1941, p. 334.

not differing in appearance from that of the untreated case and therefore self-evident on examination; and postradiation ulceration—quite a different entity. In Todd's series postradiation ulceration was rare; he saw only 10 cases in 5 years, and of these only 4 proceeded to the stage of ulceration, the remaining 6 showing merely a telangiectatic atrophy of the vesical mucosa. The ulcers were all situated above the interureteric bar, and had suspicious heaped-up edges and a surrounding zone of bullous œdema; the adjacent mucosa was blanched, with scattered telangiectatic spider-web patches; the ulcer was occupied by a slough. Treatment is expectant, and in 3 of the 4 cases the ulcer healed spontaneously with a scarred bladder base. The diagnosis of the radio-necrotic ulcer is made on the cystoscopic appearance and the absence of any definite malignant lesion. For the malignant ulcer there is no treatment. Todd divides ureteric complications into three groups: those occurring in untreated cases, and those following surgical and radiation treatment. In the first group he investigated 90 cases before treatment by retrograde or intravenous pyelography. Two of these 90 were in stage I and had no urological complications; among 26 in stage II he found hydronephrosis in 3. Among 32 in stage III he found hydronephrosis in 5 and a functionless kidney in 3 and poor renal function in 1; and among 30 cases in grade IV 10 showed hydronephrosis and 9 a functionless kidney. In many of these cases the blood-urea, investigated as a routine before treatment, was within normal limits. In a follow-up of his cases with urological complications in the upper urinary tract, Todd found that the prognosis was particularly gloomy. Postradiation complications of the upper urinary tract are not uncommon in patients investigated months or years after treatment, and Todd places the figure as high as 50% in a small series that he investigated. The lesion noted was some form of ureteric obstruction, but whether the cause was actual stenosis from growth or fibrosis he declined to decide.

TROUBLE WITH TRIGONELLINE

THE assessment of nutritional status is gradually being placed on a quantitative basis. Thanks largely to the work of Leslie Harris and his collaborators at Cambridge, methods have been evolved of estimating the level of nutrition in respect of certain water-soluble vitamins. They found that people with recognisable vitamin deficiency—for example, with scurvy—excreted much less of the vitamin in the urine than did people on diets well provided with it.[1] The "saturation" tests evolved by these investigators made it possible to determine the amount of (say) vitamin C which it was necessary to administer as "test doses" before the excess overflowed in the urine. By comparison with subjects known to be receiving optimal amounts of the vitamin it became possible to determine with some degree of accuracy the deficit of the vitamin in subjects who were only mildly below standard and who had no obvious clinical manifestations of scurvy. Such tests have since been used extensively for assessing[2] the nutritional level of vitamin C and, more recently,[3] of vitamin B_1. Since the discovery and identification of nicotinic acid as the pellagra-preventing vitamin, many workers have elaborated methods for estimating it in the urine, in the hope of developing a saturation test for detecting its deficiency. It is now possible to determine the amount of the vitamin excreted with some degree of accuracy, and several investigators have already found that the "resting" excretion—i.e., in the absence of test dosing—is diminished in deficiency of this vitamin.[4] It was recognised, though, that test dosing would probably give a better indication of deficiency than the simple determination of resting levels. Some workers, for example, suggest that there may be overlap in the resting excretions, so that normal subjects occasionally excrete less nicotinic acid than subjects who are deficient.[5]

The question of test dosing is however complicated by the fact that ingested nicotinic acid is excreted in the urine partly as such and partly as other conjugated or degradation products, the most important of which is trigonelline. The excretion of trigonelline, which is biologically inactive, is also affected by factors other than nicotinic-acid intake, being especially increased by substances rich in trigonelline such as legumes. But provided the diet is free from trigonelline, it has been shown independently by workers both in America[5] and in Cambridge[6] that the resting excretion of trigonelline is diminished in deficiency, and this diminution may be more considerable than that of the nicotinic acid itself. The Cambridge workers have also devised an accurate method for estimating trigonelline, which previously has only been determined semi-quantitatively. They suggest that the saturation technique (in which the vitamin is given and the excretion of trigonelline measured) provides a better measure of antipellagra status than the measurement of the resting level of excretion; the amount of trigonelline derived from the controlled diet will be insignificant compared with the much larger quantities produced from the test doses of the vitamin. On the other hand, should it be impossible to arrange for the controlled diet and for the test dosing, the estimation of nicotinic acid in the urine is to be preferred to that of trigonelline, since nicotinic acid is derived from the vitamin alone, whereas trigonelline may be derived from biologically inactive substances in the diet. It will be of interest to see further results in this field, particularly since it has been suggested that nicotinic-acid deficiency may play a part in the causation of Vincent's angina and of some types of stomatitis as well as in pellagra-like dermatitis.

1. Harris, L. J. and Ray, S. N. *Lancet*, 1935, **1**, 71.
2. Harris, *Ibid*, 1940, **2**, 259.
3. Wang, Y. L. and Harris *Biochem. J.* 1939, **33**, 1356.
4. Harris and Raymond, W. D. *Ibid*, p. 2011; Kühnau, J. *Klin. Wschr.* 1939, **18**, 1333; Rosenblum, L. A. and Kühnau *J. Biol. Chem.* 1940, **134**, 1; Naganna, B., Giri, K. V. and Venkatesam, P. *Ind. med. J.* 1941, **76**, 208.
5. Field, H., jun., Melnick, D., Robinson, W. D. and Wilkinson, C. F. jun. *J. clin. Invest.* July, 1941, 379.
6. Kodicek, E. and Wang, *Nature*, July 5, 1941, p. 23.

Dr. THURNAM, whose death at the age of 71 is announced in another column, was one of Dr. Otto Walther's early patients at Nordrach and on his return from the Black Forest founded on the Mendips the first sanatorium to be run on Nordrach lines. Walther remained almost unknown in his own country and it was his British and American patients who brought to light the robust open-air treatment which he initiated and introduced a new era in open bedroom windows.

ANGLO-SOVIET MEDICAL COMMITTEE.—An executive committee has now been appointed to carry out the plans of the Anglo-Soviet Medical Committee formed on Sept. 10 (*Lancet*, Sept. 20, p. 344). At a meeting of the executive on Oct. 8, with Sir Alfred Webb-Johnson the president, in the chair, there was progress to report: 26 doctors have volunteered to help with translations and the Society for Cultural Relations with Russia have handed over all their medical literature to the committee. A new task to be undertaken is that of advising lay organisations on the purchase of medical supplies for the U.S.S.R. Sir Alfred considered that the committee should accept responsibility for giving such advice but should not be responsible for making purchases or arranging shipments. Mr. Somerville Hastings said that the Welsh miners had raised £60,000 for this purpose, and that his advice had been sought about its disposal. Lord Dawson and Lord Horder suggested that the committee should work with the joint Red Cross in this matter. A subcommittee was appointed to explore the situation and give advice.

Special Articles

RADIUM THERAPY IN WAR-TIME

M. LEDERMAN, M.B. LOND., D.M.R.E.
RADIUM THERAPIST, ROYAL CANCER HOSPITAL (FREE)

W. V. MAYNEORD, D.SC. BIRM., F.INST.P.
PHYSICIST TO THE HOSPITAL

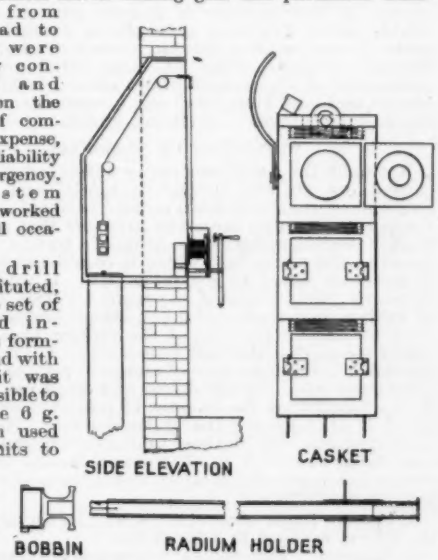
AT the outbreak of war radium therapy was one of the few branches of medicine the practice of which seemed inadvisable, if not impossible, under the anticipated conditions of warfare. Not only is radium very costly, so that the loss of any large quantity would prove a serious financial problem to any hospital or doctor, but in the event of the destruction of radium-containing apparatus by bombing the scattering of the contained radium salt might render the site of disaster dangerous until the dispersed radium could be recovered. Should recovery not prove possible the scattered radium salt would retain its radio-active properties for centuries and constitute a possible danger to workers undertaking clearance of the site or erection of new buildings, or to future inhabitants of the buildings.

The scattered radium salt is harmful inasmuch as its entry in the form of radio-active dust into the body, by inhalation or ingestion, results in radium poisoning,[1 2] a condition which should not be confused with the effects of the therapeutic use of radium, wherein the body tissues are exposed to the radiations from radium and its products. After entry into the body radium behaves in a manner comparable to lead, being carried in the blood-stream and either excreted, or deposited in the bones, bone-marrow, liver, lungs and spleen. The rate of elimination is at first rapid but quickly diminishes with the passage of time. After a year any radium in the body is to all intents and purposes fixed. The clinical phenomena associated with radium poisoning are chronic, and arise from the fixed radium which acts by producing an alpha-particle bombardment of the tissues in which it is deposited. Usually no harmful effects are noticed until years after the entry of the radium into the system. That the osseous and hæmopoietic systems suffer chiefly is shown by the occurrence of bone necrosis, radiation osteitis, spontaneous fracture and osteosarcoma. Changes in the blood are usually in the form of regenerative anæmia of the myeloblastic or pernicious type, in contrast to the anæmia secondary to excessive gamma radiation, which tends to be aplastic. Colwell and Russ [2] say: "It has been estimated that 10 microgrammes of radium distributed over the whole skeleton would be sufficient to produce a horrible death, years after it had been ingested. So far as we can see, radium is thus the most deadly poison known; tetanus toxin had, we believe, previously held the record with a lethal dose of 0·22 mg."

PROCEDURE AT THE ROYAL CANCER HOSPITAL (FREE)

At the outbreak of war the radium stocks of the Royal Cancer Hospital, in common with those of several other London hospitals, were buried in a specially constructed borehole extending to 50 ft. below ground, at which depth the radium was considered safe even from a direct hit by a large calibre bomb. At the end of November, 1939, however, it was possible to resume to a restricted extent the use of radium in the treatment of patients. Two of the three existing teleradium units (one 5 g. and one 1 g.) were put into commission and 0·5 g. of radium in the form of tubes of various denominations was made available for use in surface radium and gynæcological applicators. The third teleradium unit possessed by the hospital was so constructed that the radium, once in place, could not easily be removed.

In order that the radium in these units could be quickly buried in case of air attack a second borehole (see figure) was constructed immediately outside the teleradium treatment room, which is situated on a second floor approximately 30 ft. above ground level. A steel tube 70 ft. long was sunk 40 ft. into concrete, the remaining 30 ft. just reaching the sill of a window of the treatment room. By removing the window and building a small cage outside, a radium table was formed just reached by the steel tube. A simple wooden sliding door and steel plate which could be locked in position normally closed the top of the hole. A special casket having three compartments and suspended from a steel hawser acted as a container for the radium. The doors of the casket were so designed as to be closed and locked in position very quickly and securely. The three compartments were used for 5 g., 1 g., and radium tubes respectively. A winch and series of pulleys completed the apparatus needed for raising and lowering the radium to and from the place of safety. Several more complex systems involving motor-driven hauling gear and pneumatic transference from bomb-head to borehole were carefully considered and rejected on the grounds of complexity, expense, and unreliability in an emergency. The system chosen has worked well on all occasions.



A.R.P. drill was instituted, a suitable set of rules and instructions formulated, and with practice it was found possible to return the 6 g. of radium used in the units to the casket and to lower it out of sight in 15 sec. About 45 sec. sufficed to lower to the bottom of the borehole, the speed of the casket being controlled by pressure on the rim of the wheel of the winch. The radium was lowered on the sounding of an alert and at the completion of treatments at the end of each day. Special holders were designed to aid in the rapid removal of the radium from the unit to the borehole.

Until September, 1940, cancer of the skin and cancer of the uterus were treated by the appropriate types of applicator without any serious restriction. For insertion into the tissues radon needles have been used at all times, though recently (June, 1941) some radium needles have been put into use. Owing to the continual air attacks on London in September, 1940, it was found advisable to abandon temporarily the use of radium in the form of surface or intravaginal applicators, but treatment by teleradium continued without interruption. The net effect of the day and night air-raids has been to restrict the number of cases treated, but in recent months it has been found possible to return once again to normal standards.

The treatment of skin cancer and cancer of the uterus by radium was resumed early in October, 1940. Radium applicators were employed for the cases of skin cancer. The quantities used were relatively small, only one patient was treated at a time and treatment was always carried out during daylight hours. As the patient was kept in a ward near the radium department these applicators could be quickly removed and transferred to the borehole when the occasion demanded, a special compartment being available in the casket. The position with regard to intra-uterine and intravaginal applicators was rather different. Continuity of treatment is important and the rapid removal of the applicators presents difficulties. To remove applicators of this type every time a warning was sounded, or to use radon instead of radium, would have made treatment impracticable, for transfer of the radium to a place of safety could not be effected quickly (that is, in less

1. Evans, R. D. *Amer. J. publ. Hlth*, 1933, **23**, 1017; *Amer. J. Roentgenol.* 1937, **37**, 368; Aub, J. C., Evans, R. D., Gallagher, D. M. and Tibbetts, D. M. *Ann. intern. Med.* 1938, **11**, 1443.
2. Colwell, H. A. and Russ, S. X-ray and Radium Injuries, London, 1934, p. 178.

than 2 min.) and meanwhile a large quantity of radium would have been exposed to danger. Secondly, radon supplies in the quantity necessary to treat any appreciable number of these cases are not readily or regularly available. To meet this situation the following arrangements were made. Not more than 90 mg. of radium was ever left in use during an air-raid and the patient with intravaginal and intra-uterine radium was kept in a room by herself in the safest part of the hospital —the ground floor of a modern five-storey ferroconcrete building. Responsibility for the safety of the radium was allocated in the event of enforced evacuation of the hospital, and rules formulated for other relevant emergencies. In the circumstances it was felt that the chance of dissemination of radium salt enclosed in a double metal container and placed within the deep parts of the female pelvis were small even should the hospital sustain a direct hit, since only complete disintegration of the patient would cause loss of the containers and even then there was a reasonable chance of the metal containers remaining intact.

PROTECTION OF PERSONNEL

Normally the conditions under which radium work is carried out are the subject of special and stringent recommendations laid down by international agreement. Protective measures are taken to ensure that no radium worker receives radiation in excess of a certain minimum quantity (0·2 r. per day) which is considered to be consistent with safety to general health. It was obvious, of course, that repeated exposure to large quantities of radium under abnormal conditions imposed by the need for speedy removal of the radium to a place of safety meant that the staff responsible for this work ran the risk of receiving a dose of radiation greater than that considered safe. By calculation and direct measurement it was found that the amount of radiation received by the staff still lay below the "tolerance dose," the average daily dose received by those taking part in the transference being about 0·1 r. The special means adopted to ensure the maximum of safety under the new conditions were therefore briefly :

1. Speed. Rapid removal of the radium serves to reduce the time of exposure to a minimum.

2. Distance. The radium containers are kept as far as possible from the body during transference.

3. Careful check is kept on the amount of radiation received during the duty periods of the members of the radium department. An ionisation chamber is normally carried by each person employed in radium work at this hospital, and this check now becomes doubly important.

4. Distribution of the risk among as many individuals as possible. Initially a rota consisting of 8 members of the radium and physics departments was employed ; but it was soon found possible to divide this work among fewer people without harmful result.

As the result of the experience of eighteen months we have no reason, either clinical or physical, to question the effectiveness of the methods employed from the point of view of protection of personnel.

WAR AND THE PATIENT

At various times since the outbreak of war patients requiring treatment by radium have undoubtedly suffered and some have even lost their lives as a result of the impairment of the facilities normally available during peace-time. Patients undergoing radium treatment at the Royal Cancer Hospital at the outbreak of war had to be discharged, and, although it was found possible to recommence the treatment by X-ray therapy of some of these cases several weeks later, the remainder who could not be so treated have succumbed to their disease and the outlook of those who restarted was considerably affected. For the first five months of the war no cases of cancer of the uterine cervix were treated by radium at this hospital. With the possible exception of stage-1 cases, it is doubtful whether either of the alternative methods of treatment (surgery or X-ray therapy) can satisfactorily replace radium in the treatment of every type of case, so that the patients treated by these methods during the period in question must be considered as having had inferior treatment.

The dispersal of population either as a result of deliberate evacuation to other parts of the country or migration to other parts of London because of air-raids, the shelter-life led by many patients of the hospital class since September, 1940, and the bombing of hospitals and temporary disorganisation of civilian medical practice have had the result that new cases coming for treatment are less numerous. It was rare, for a time, to see a hospital patient with an early lesion in certain body sites (buccal cavity, pharynx, cervix). In the two years preceding the war the number of early cases of disease in these situations attending for radium treatment had shown an encouraging increase, and there seemed reasonable hope that this was because the importance of early diagnosis and treatment was being realised by both patient and doctor. If so, the war has largely nullified the work of years of careful and persistent propaganda just when tangible results were forthcoming.

In normal times a waiting-list can be kept down to an unavoidable minimum, but since the outbreak of war the number of beds available for cancer cases at this hospital has had to be reduced with the result that the waiting-list has increased. Although during the quiescent periods of the war no time was needlessly lost in treating patients for whom the slightest hope of cure existed, since the onset of intensive air-raids it has on occasion proved difficult to arrange the admission of patients to hospital as rapidly as one might have wished. Another point of importance is the difficulty in obtaining radon supplies at reasonably short notice. This difficulty led to an early request by the honorary staff for the resumption of the use of radium needles, but no further action was taken at this hospital until recently.

An efficient follow-up system is an essential part of any cancer service, its primary objects being to facilitate early detection of recurrence or of further metastases after treatment, and to permit correct assessment of late results of treatment and comparison of different methods of treatment. It is thus a necessary adjunct to clinical cancer research. The efficiency of this system at the hospital has for various reasons dropped from 95% to about 55%. Many patients have evacuated. Some have kept in touch with the hospital but many have neglected to do so. Others have lost their homes as a result of enemy action, and have been very difficult to trace. Private doctors are often of great assistance in providing information about patients who cannot attend regularly for examination. In several cases these doctors are either on military service or have lost their surgeries by bombing so that it is difficult to make contact with them for information. Other hospitals occasionally undertake the follow-up of patients living in their districts, and in some cases we have been deprived of follow-up information owing to the destruction of their hospital records. Although outpatient sessions are held in the morning to save patients travelling during the blackout, difficulties of transport or fear of air-raids have prevented some patients reporting. We do not as yet know whether any of the untraced patients have been killed by enemy action, but it may be necessary to make allowance for cases of this kind in future surveys. The effect on the patients of the lack of regular supervision is seen from time to time when an untraced patient ultimately appears with an advanced recurrence, having delayed coming for one of many possible reasons connected with the war.

Even in normal times, with a full range of foods to choose from, the feeding of patients undergoing teleradium treatment for cancer in the head and neck region is fraught with difficulties. Not only does the treatment induce anorexia and perversion of taste but reactions in the irradiated mucous membranes give rise to dryness, pain and dysphagia. Ordinarily, semi-solid or fluid diet containing eggs, milk, fats and carbohydrates of high caloric value form a basic food designed to supply 2000 Calories per day, which is considered the minimum requirement for these patients. But in spite of difficulties in obtaining many of the common items, the culinary ingenuity of the nurses responsible for feeding these patients has been such that no patient has suffered as a result of the shortage.

Two other points deserve mention. Most of those undergoing teleradium treatment are inpatients, and during periods of intense air-raids are often concerned about the welfare of their relatives. This worry, added

to the mental depression usually associated with the long and tedious course of the treatment, affects adversely the well-being and equanimity of many patients. They become irritable and non-coöperative, often at a time when full coöperation is imperative, and when the actual treatment is completed they hasten home long before their reactions have subsided or they are fit to go. As home often means a public shelter at night, the chances of a debilitated patient succumbing to an intercurrent infection is high, and we have noted the death soon after leaving hospital of 2 patients who would probably have survived had they remained in hospital until they were fit to go. For treatment of cancer by irradiation to be effective regard must be paid to the time over which the treatment is spread. Any appreciable interruptions or delays in the ordered continuity of treatment diminish its value. Several times since September, 1940, patients have interrupted their treatment to return to their homes—or erst-while homes—because of a tragic domestic sequel to an air-raid. In a few cases when the patients have not returned to complete the treatment it is certain that they will succumb to their disease. Where the patients have returned it is as yet too early to assess the precise effect the delay may have on the ultimate response to treatment.

We would like to acknowledge our gratitude to the members of our staffs who have carried on their normal and abnormal duties under very trying circumstances, and have thereby enabled radium treatment to be continued in this hospital. In particular we would mention Miss E. W. Glazebrook, sister in the radium department and Dr. J. R. Clarkson of the physics department. The accessories to the borehole were constructed by Messrs. H. Hodt, senior and junior, technicians to the physics department.

INTERNATIONAL STANDARD FOR VITAMIN E

AN international standard for vitamin E has been established and, as in the case of the international standards for vitamins A, B_1, C and D, the National Institute for Medical Research, London, acting on behalf of the Health Organisation of the League of Nations, has undertaken its supply to laboratories, institutes and research workers throughout the world.

Synthetic racemic α-tocopheryl acetate ($C_{31}H_{52}O_3$) has been adopted as the international standard for vitamin E. The investigation of the chemical, physical and biological properties of this substance, its suitability for adoption as the international standard and the manner of its application in biological assay was carried out, at the request of the Health Organisation of the League of Nations, by the vitamin E subcommittee of the accessory food factors committee of the Lister Institute and the Medical Research Council. The subcommittee were able to enlist the coöperation of experts in fourteen laboratories in Europe and America, and have recommended the adoption of synthetic racemic α-tocopheryl acetate as the international standard. They further recommend that the international unit for vitamin E should be defined as the specific activity of 1 mg. of the standard preparation, this being the average amount which, when administered by mouth, prevents resorption-gestation in rats deprived of vitamin E.

In normal times the results of the coöperative investigation would have been submitted for discussion at the third international conference on vitamin standardisation, which had been arranged for the autumn of 1939, but because of the war this conference was not held. The report and recommendations of the subcommittee have, however, been placed before the members and officers of the League of Nations' Permanent Commission on Biological Standardisation and of the International Conference on Vitamin Standardisation, who were available, and they have accepted the responsibility of adopting the proposed standard for vitamin E, accepting the recommendation defining the international unit, and authorising the National Institute for Medical Research to proceed with the distribution of the standard.

The international standard for vitamin E is issued as a solution in olive oil of which one international unit is contained in 0·1 g. In countries where national control centres have been established it will be supplied to their directors for local distribution; it will also be supplied to laboratories, institutes and research workers in this country, and in countries in which national control centres have not yet been set up. Application should be made to the department of biological standards of the National Institute for Medical Research, Hampstead, London, N.W.3.

MEDICINE AND THE LAW

Illness after Hotel Lunch

CATERING establishments do not guarantee the health of every visitor to whom they serve a meal. Actions for damages are sometimes brought by visitors who have felt ill after eating at a restaurant or hotel. They do not always succeed; *post hoc* is not necessarily *propter hoc*. In the recent county court case of Braham *v.* Grand Hotel, Birmingham, a lady gave evidence that, while eating steak and kidney pie at the hotel, she found something unexpectedly solid in her mouth. She thought it might be a piece of tooth; it turned out to be a chip of crockery. That night, she said, she woke in great pain; there was medical evidence that she was suffering from food poisoning. She claimed damages for breach of warranty of the quality of food supplied; alternatively she alleged negligence in allowing the food to become contaminated. On the other hand, the defendants denied that the food was defective or that their staff had been negligent. There seemed no necessary connexion between the chip of crockery and food poisoning. They had served nearly a hundred portions of steak and kidney pie that day, and this was the only complaint. The city bacteriologist found no poisonous organisms in the pie. The judge disregarded the crock. He found no indication of slackness in the conduct of the hotel. The only suggestion against the pie was that the plaintiff was ill after eating it: it would be unsafe to say that the illness was due to the hotel luncheon. Judgment for the defendants with costs.

NEW OFFICIAL NAMES FOR DRUGS

THE General Medical Council has issued a further list of approved names for drugs which are now produced or likely to be produced in this country.

Approved name	*Other names*
Amethocaine hydrochloride	Decicain
Menaphthone	2-methyl-1 : 4-naphthoquinone
Pethidine hydrochloride	Dolantin
Soluble phenytoin	Epanutin, Eptoin, sodium diphenylhydantoinate, Solantoin, Soluble Dilantin.
Sulphacetamide	Albucid

The council hopes that these and the approved names previously published [1] will be generally adopted.

ORTHOPÆDIC CONFERENCE AT ROEHAMPTON

A CONFERENCE of the orthopædic surgeons attached to the Ministry of Pensions hospitals was held at Queen Mary's Hospital, Roehampton, on Sept. 24–26, Mr. G. R. Girdlestone, honorary consultant to the ministry, presiding. Clinical rounds were conducted by Mr. Pomfret Kilner and Mr. George Perkins, and Mr. Fraser demonstrated the methods used by himself and Mr. Kilner in fractures of the jaws. Dr. R. D. L. Kelham, surgeon in charge of the limb-fitting department, assisted by Captain Maxwell, gave lecture-demonstrations on modern artificial limbs, and explained the present-day sites of election—for an above-knee amputation 10 in. below the tip of the greater trochanter; for a below-knee amputation 5½ in. below the level of the knee-joint on the medial side; for an above-elbow amputation 8 in. from the acromion process; and for a below-elbow amputation 7 in. from the tip of the olecranon. Surgeon Lieut.-Commander John Bunyan, R.N.V.R., showed a cinematograph film of the results of treating burns by irrigation with electrolytic sodium hypochlorite in the Stannard bag, and afterwards demonstrated his procedure on patients from the Queen Alexandra Hospital, Cosham, and other cases with septic amputation stumps and wounds. The conference provided an opportunity for exchanging views on orthopædic treatment and coördinating the work being carried out in ministry hospitals.

1. See *Lancet*, 1940, **1**, 804; 1941, **1**, 614.

In England Now

A Running Commentary by Peripatetic Correspondents

THE call was for blood—human blood. It all began in the early summer of 1939 when a well-known radio commentator asked a responsive public to report for service at their nearest hospital. What was to be done with all these volunteers? Were they to be admitted to our select body of hospital donors or were they to constitute a "national emergency panel—Garumchester (pronounced Gumster) branch." We decided on the latter course. In the rapidly growing queue outside the pathological department the secretary discerned some of Garumchester's leading citizens, including civic and legal dignitaries, a retired aristocrat of the Church and another volunteer entitled to wear a small size in coronets. "Am I to enter them all for Wassermanns?" she asked, betraying her concern at the serodiagnostician's lack of discrimination. Our senior technician remarked that an occasional transfusion of luetic blood would make little difference after three or four years of total war, but his implication was considered to be both unjust and cynical. "Why not wait and do the Wassermann when you take the blood?" he said; "the fact that they are negative now doesn't mean that they will be after a couple of years of war. Anyway, what's arsenic for?" The essential wisdom of his remarks was accepted and the volunteers were rapidly reviewed, being let off with an inspection of the arm veins and the token donation of two or three drops of blood for the grouping test. We closed the laboratory that evening with schemes already afoot for running the department on a war basis. If the worst happened pathological investigations would have to be rationed, clerical work curtailed and all reports shortened. We sincerely hoped war would not come but we were resolved that if it did there should be no deterioration in our ability to aid in the diagnosis of venereal disease. "Do you mind if I slip off a little early tonight," asked the senior technician, "to plant a few more rows of winter greens for the guineapigs. We can't afford to let the complement fall below 0·08 in war-time," he added, "and an intensive course of purple sprouting before the breeding season is beneficial; if it comes to that, it wouldn't do me any harm myself."

This is a war of battles. The Battle of the Blood Groups is still on. We were all asked to adopt the League of Nations classification and most of us did, bearing the genial sarcasm of the more senior clinicians. "In my day, my boy, 1, 2, 3 and 4 were good enough for us; why alter it?" "But, my dear Hornbeam, the newly adopted classification does tell me the agglutinogen content of the corpuscles, and therefore I find it preferable to the Moss and Jansky schemes which lead only to confusion." "I should forget about those—those things you were talking about," rejoined our pathologophobe, emphasising his remarks with the instrument of precision which is habitually suspended around his neck, "we always managed to transfuse without them before you came here and if you take my advice you will not alter the present arrangements. Of course, transfusion came in after my day, but I have watched it develop." "Did you ever run across James Blundell, of George's, sir? He was one of the first on the job." "I used to go there quite a lot when I was dressing at Ananias's," he replied, "but I don't recall him." "He may have been after your day," I rejoined cautiously. "He wasn't born till 1790."

Many of us have met this unwillingness to accept the international classification; the compromise which most have adopted is to give that of Moss first followed by the international version in brackets. The more daring have reversed the procedure and told our printers to lighten the bracketed numbers with each succeeding impression. The dual system of nomenclature has raised misgivings in some donors, who don't much like belonging to group B3. "I live a healthy out-of-doors life and never had a doctor since my last baby, but Mrs. J. around the corner in Plaice St. has blood which the doctor said is very rich—he called it A1—and she isn't nearly so particular as to what she eats. Tell me, doctor, what I ought to take to make my blood A1?" What a blessing the Geneva tribunal didn't ordain A, B, C and D for the groups! C3 blood would have taken some explaining away.

* * *

In our area is included what must surely be the most delightful small country town in England, far from forgotten by the poets. In this charming community the keenness for the blood-transfusion service exceeded anything previously seen, and on a warm day in June we enrolled close on 8% of the population as donors. The local organisers were surprised at the success of their scheme and were anxious to reach a certain round number. A request was therefore sent to the cinema nearby, the pub opposite and the adjoining dance hall. The response was gratifying. The cinema interrupted its performance while the visitors, led by the jovial manager and the bar-tender, with his thirsty followers, filed in to be tested before resuming consumption of films and drinks. Later, on this summer evening, a procession of men and girls from the dance hall arrived, the girls still wearing their cool and colourful evening frocks. Afterwards we were able to report that the required number had been exceeded.

Most of our donors hide their lamps under bushels. A few of them, however, are fussed over by anxious relatives who are assured by the victim that although it wasn't too bad the fact remains that he is now working with a pint less blood than before; but that he doesn't intend to let the work suffer for it and he will see that it is done just the same. It requires more than average human effort of will to discourage the hero-worshipper. But this type of donor, who is fortunately rare, may do much to delay recruiting in a small community, and embarrass the machinations of the local hæmophilist. On the other hand, we have met with many instances which reflect great keenness to serve, as well as personal courage. There was the youth who had recently lost an arm in an accident and whose other arm was ankylosed to an angle which would have made it wellnigh impossible to insert the needle. The deaf, the lame, the blind and even the paralysed have visited us to give their donations. We have had to reject many who were too ill—a woman with carcinomatosis, a girl in an advanced state of phthisis and an old man with heart failure; he had been compelled to abandon munition work and had chosen this alternative form of national service. In one hamlet no less than fifty near neighbours assembled in a farm-house kitchen on a Sunday evening in late spring and braved a deluge to get through. An old lady who was rejected because of ill health burst into tears.

One afternoon in winter we were due to group inhabitants of a few lonely hamlets pocketed away in the hills. Our hostess's suggestion to "bring chains" seemed to us in the town sixteen miles away rather fatuous, but we were glad of her advice and only after a hazardous and circuitous route did we reach the house. Our fears that the volunteers would not venture through the storm were dispelled by our hostess who assured us that they would all come—as indeed they did. They came through driving snow and the blackout, fine hefty farm lads, land girls and farmers' wives, all ready to give first-aid to the blitzed cities. We have had girls of fifteen and sixteen posing as eighteen in order to be accepted, and old men and women taking off ten years or so; and what a good response we have had from ex-Service men of all ranks. In fact, there is no section of the community which has not responded, while friendly, neutral and enemy aliens have come forward equally well. It is particularly gratifying to enrol people who have themselves been transfused at some time in the past and are now ready to pay back. Evacuees and especially those from the bombed areas are amongst our keenest customers. One woman had come over from a nearby town, temporarily disorganised after a heavy raid, in order to shop; she was so delighted at her successful forage that she came along to show her appreciation by an offer of blood. We had a visit from a member of the London A.F.S. who had been sent down for a week's rest. He was so grateful to the inhabitants for the hospitality they had shown him that he came along to give a donation of blood to the local bank by way of repayment. He wrote later "How are your blood donors, are they rolling in, or do you sit patiently gazing at your samples, waiting for a customer to call? Should the patient who had my blood ever complain of hearing fire-bells, just tell him it is a false

alarm. Don't forget, doc, if you want more just let me know and I'll be right on the spot. Funny thing, hardly ever gave hospitals a thought until that day, then I realised that every day there are patients and children there. P.S. Your blackout is deplorable."

* * *

By tortuous ways a copy of the *Deutsche medizinische Wochenschrift* for Sept. 5 has come into my hands and I have eagerly scanned the page of *kleine Mitteilungen* (or news stories) which is all that this fat medical weekly allows itself to tell of current happenings in *Grossdeutschland*. Pride of place is given to an announcement of a final medical examination next June under the new regulations which prescribe two preclinical and two clinical years or four years of medical study after military and labour service are over. The old regulations remain in force at Vienna, Graz and Innsbruck. Women medical students will be allowed to count emergency nursing as part of the prescribed course in place of factory and agricultural service. Then we are told that the *Führer* has set up in Berlin under Home Office control an official institute for assessing vitamins and finding new ones. There was to be a three-day festival in Salzburg to Paracelsus with foreign guests and a gala performance of Goethe's "Faust," followed by a two-day conference on the Alpine climate, opened by Dr. Conti, medical director-general, and covering besides physiology, psychology and the inevitable raciology, such things as hypnotic drugs, sulphonamide therapy and the treatment of sterility. A ten-days course at Alt-Rehse has the astonishing title of "The totalitarian idea in dentistry," with lectures on chewing gymnastics, relaxation therapy and psychopathology of artificial dentures, as well as the more familiar focal infection. Scanty university news is eked out with some trifling honours to Prof. Paul Diepgen in Buenos Aires and Bucharest, and the 70th birthday of Prof. Birch-Hirschfeld. Book announcements include the final instalment (bibliography) of Bamann and Myrbäck's "Methods of Ferment Investigation," a new study of the anti-tuberculosis campaign, two small practical books on diabetes, a standard work on the public-health doctor, and a new edition of Schede's "Hygiene of the Foot." Not very exciting, you may say, but nevertheless a rough sketch of the background of medicine in contemporary Germany. But one of my fellow peripatetics might have made more of it.

* * *

I was rather surprised to hear the other Sunday that the Brains Trust had no idea why man enjoyed music. Obviously man's acoustic apparatus was not formed for hearing his own and other people's voices. It was formed for defence, though for this purpose, in modern times when auditory awareness is not of such vital necessity, it has atrophied. As natural man or any other animal moves about he is surrounded by a myriad noises, the manifold rustlings of the vegetable world, the rippling of the poplars, the harsh whisper of the holly, the dry-sand sound of the acacia, a vast insect orchestra, the song of sea or river, animal and bird calls, and the noise of his own movements. As a babe he was frightened of some of these noises, but gradually one by one he admitted them as friendly noises, until their number was so large that he couldn't give them individual attention; so, probably by allowing entrance to a note here and there from each, he blended them into a pattern. This pattern of friendly noises surrounded him in his waking hours and to some extent in his sleep. (Most sailors wake up if the ship's engine stops when they are asleep.) This pattern is a protection, like tentacles cast near and far, for the approach of an enemy or even the sudden cessation of one of its constituents would break the pattern and put him on the alert and in a mild state of fear. The hearing of the pattern then meant safety. Modern man uses the same mechanism though not so often for defence; he can turn what he knows to be a harmless and friendly railway train's noises into a rhythm—arankatitanka-titanka. He can turn his own wireless blare into a soothing background of sound, though he has much more difficulty with his neighbour's which he feels to be hostile. Absolute silence, which is a rarity in the natural world and meant to man that he was without his acoustic protection, still brings a feeling of awe. Incidentally in tinnitus there is a great effort on the part of the pattern-making mechanism to turn the intrinsic stimulations of the cochlear nerve into friendly noises—"wind in the chimney" and "an outboard motor with an occasional mis-beat" are the last two in my case-book. Now music, and to some extent verse, not only gives a well-ordered pattern of noise and therefore a feeling of safety, but it does so ready made, without any strain on the pattern-making mechanism, leaving the other emotions, uninhibited by fear, free to have a binge. Why precisely "Rule Britannia" should make one want to cut throats and Handel's Largo to ooze altruism probably depends on memories, words or suggestions, associated with their particular chords. Elementary, my dear Julian!

* * *

It is traditional that a doctor is unwise to treat the members of his family, from which arises some of the difficulty about repaying a colleague for kindness. I have never held this view; the unwisdom supposes that the medical husband and father is either unable or unwilling to approach the case detached, or that he finds it irksome to regard such a patient in terms of anatomy, physiology and pathology. Maternal anxiety may be the cause of much of this. The same doctor, however, essays the correct approach to those non-family patients with whom he is on terms of close social intimacy. How many doctors find it inconvenient to make an internal examination of a constant bridge partner? If for no other reason than this, the plight of such a patient justifies the existence of the independent consultant group. Years ago as I was leaving home one morning my neighbour, a London surgeon, told me almost casually that his wife's bowel was resisting enemata; the number had reached seventeen. I knew nothing of her medical past, which included operation for ovarian cyst, but I murmured equally casually that a band might be the cause. On my return in the evening the ambulance was at his door and a surgeon ready at the nursing home, but she died that night. Lately I have myself had the care of a doctor's wife at a distance. He has no colleague within ten miles and more; on the eighth day he asked me to come over. I found lobar pneumonia, with the crisis yet to come in spite of his sulphapyridine. He had not been able to diagnose pneumonia for certain because his wife was still about and had declined to permit him to investigate.

* * *

"You are going on holiday next week?" I inquired. "Aye, next week, Sir," replied John, the senior laboratory attendant, adjusting the time-marker. "Rothesay?" "Aye." "The children will be very excited?" I ventured. "Aye, they are so." "And what about yourself, John—do you still enjoy a seaside holiday?" "Aye," he said again; but this time his tone implied serious reservations. He was obviously uneasy. His answer would need elaboration. I watched the struggle between his innate reticence and his Covenanter's zeal for truth. At last he looked up. "Doctor," he began. "Yes?" "Shall I tell ye what I consider to be the best part of ma holiday?" he asked solemnly. "Do!" I exclaimed enthusiastically, and settled down to listen. Would the high spot be the morning stroll along the promenade? Sun-bathing? No, I felt sure that John would frown on that; but I was prepared to hear that in moments of complete abandon he might go so far as to paddle with the three weans. "Well, Sir," he proceeded, as a faintly ecstatic expression crept into his face, "the best moment is when the train draws into Central Station when we return to Glasgow. Man," he added almost fervently, "yon's a grand smell!"

* * *

The registrar, being in a reminiscent mood, launched into an account of the death certificates which he had returned to the hospital. First came the surprising death of John Smith, aged 3 days, from chronic bronchitis and senility; and, on the same day, of William Brown, aged 86, from intracranial hæmorrhage due to birth injury. Then came the form, satisfactory in all respects except for the completion of the section "qualification." Here the worried doctor, straight from a pneumonia ward, had started with M.B. and then drifted to 693. A useful qualification, perhaps, for this day and age.

Parliament

Post-War Hospital Policy

IN the House of Commons on Oct. 9, in reply to Sir FRANCIS FREMANTLE, the MINISTER OF HEALTH said: The question of post-war hospital policy and reorganisation, more particularly in relation to the Emergency Hospital Scheme, has for some time been engaging the attention of the Government. While any immediate reorganisation must be regarded as impracticable in present circumstances, certain broad principles can be laid down as the basis of Government policy.

It is the objective of the Government as soon as may be after the war to ensure that by means of a comprehensive hospital service appropriate treatment shall be readily available to every person in need of it. It is accordingly proposed to lay on the major local authorities the duty of securing, in close coöperation with the voluntary agencies engaged in the same field, the provision of such a service by placing on a more regular footing the partnership between the local authorities and voluntary hospitals on which the present hospital services depend. The Government recognise that to achieve the best results and to avoid a wasteful multiplication of accommodation and equipment it will be necessary to design such a service by reference to areas substantially larger than those of individual local authorities. It will be the aim of the Government also to avoid overlapping and uneconomical expenditure by securing the provision of the more highly specialised services at teaching hospitals and other centres selected to serve these wider areas, and by arranging for a proper division of function between hospitals in these areas.

With regard to the financial aspects of the Government's proposals, it is their intention to maintain the principle that in general patients should be called on to make a reasonable payment towards the cost whether through contributory schemes or otherwise. In so far as any new burden may be thrown upon local authorities in providing or maintaining hospital accommodation, or in contributing towards the expenditure of voluntary hospitals, a financial contribution, the extent of which will be a matter for further consideration, will be made available from the Exchequer. Special arrangements for dealing with the teaching hospitals by way of increased educational grants are in contemplation.

In present circumstances the arrangements for hospital services must be determined by war-time requirements, but the Government are anxious to take every step to avoid any unnecessary delay. I have already had preliminary discussions with the bodies representing the municipal hospital authorities and the voluntary hospital movement and I am hopeful that these discussions will be continued. With their concurrence I am instituting a survey of hospitals in London and the surrounding area, to provide the information needed as a basis for future plans. As regards the remainder of the country, valuable preliminary work has already been done in some areas by bodies representing both the municipal and voluntary hospital authorities, in particular, by an organisation formed under the auspices of the Nuffield Provincial Hospitals Trust. In any surveys which it may be found necessary to institute in the provinces I shall have full regard to the information already available in this way, which I am glad to know will be at my disposal for the purpose.

Mr. BROWN added that the aims of future policy in Scotland were generally similar, but that certain important differences in the Emergency Hospital Service and in the methods of financing voluntary hospitals in Scotland were being given special consideration.

Man Power and the War Effort

Man power is the beginning and the end of our war effort and a debate in the Commons on Oct. 8 brought out clearly the difficulty of striking a fair balance between the needs of industry and of the services. As Mr. GRAHAM WHITE pointed out, not only must we equip our men but we must man our equipment. He appealed to the Government not to confuse time with eternity and he warned them that the fabric of distribution by the food trade was wearing thin. It was no less important to fill men's stomachs than to fill shells. He did not think the Industrial Research Board was being given a fair opportunity of working out the best hours of work for different jobs. Miss MEGAN LLOYD GEORGE deplored the fresh call-up of land-workers, for though there may be an alternative between guns and butter there is no alternative between guns and bread. She felt that the production of red tape was still one of our major industries and asked for firm treatment of the small and select company of shirkers and for the admission of women as partners, and not as conscripts, in the greatest struggle our country has ever faced.

Replying Mr. ERNEST BEVIN said that no country, not even Germany, has tried what was virtually the compulsion of women as we have tried. But in handling women you must proceed gently and have regard for the parents. He was coming to the conclusion that block reservation would have to go and that individual reservation would have to take its place. He wished that the process of training and manning the country had taken place in peace-time and not in war-time. He would have liked to see a double-purpose army where the whole nation was trained both for fighting and production. But such a policy could not be achieved if the War Office was completely scrapped in peace-time and the Government was expected to improvise a military machine and carry out gigantic tasks in fifteen months.

QUESTION TIME

Priority Milk

Replying to a question Major G. LLOYD GEORGE said that on the recommendation of the Special Diets Committee, the milk supply scheme (see p. 473) makes provision for a wider range of sick persons than the scheme for regulating distribution which has operated throughout the summer. The arrangements for expectant mothers, children and adolescents are also based on the advice of nutritional experts.

Domestic Staff Difficulties

Miss E. RATHBONE asked the Minister of Health whether he was aware that many voluntary hospitals were seriously hampered, and some may even have to close down wholly or partly, owing to lack of ancillary staff such as stokers, porters and ward-maids; and as the work of these hospitals was work of national importance he would assist them by announcing this and by devising, in coöperation with the Ministry of Labour, some method of aiding the hospitals to obtain the necessary staff.—Mr. E. BROWN replied: I have for some time been concerned with these difficulties and I have recently discussed them with representatives of voluntary hospitals. Domestic work in hospitals is recognised as one of the services of most urgent national importance for which recruitment is to be carried out by the Minister of Labour, and I have issued a poster for circulation to hospitals to make this importance clear to those already employed in hospitals.

In answer to a further question from Sir F. FREMANTLE, Mr. BROWN added that women, including domestic staff, employed in child welfare institutions are performing a very important national service and one which should offer special attraction to older women. I am assured, he said, by the Minister of Labour that there is no present intention of calling them up for selection interview within the age-groups covered by the Registration for Employment Order.

Return of Tuberculous Soldiers

Mr. T. E. GROVES asked the Secretary of State for War if he was aware that orders had been issued by his department for 40 tuberculous military cases in the Addington Hospital, Natal, and 120 similar cases at Oribi, to be returned to this country; and whether he would state the arrangements made for the reception, distribution and maintenance of these cases when they arrived in this country.—Captain H. D. R. MARGESSON replied: No special instructions have been issued by the War Office regarding these cases, and I presume that Mr. Groves refers to general instructions regarding the return to this country from South Africa of soldiers suffering from tuberculosis. On arrival in this country soldiers suffering from tuberculosis are sent to a military hospital where they receive treatment as necessary until they are handed over to the care of the local health authority.

Coroners in England and Wales

Replying to Dr. RUSSELL THOMAS, Mr. HERBERT MORRISON said: There are 297 coroners in England and Wales of whom, according to my present information, 13 are employed on a full-time basis. Several coroners occupy more than one

coronership, the total number of coronerships being 333. The aggregate salaries of all coroners for 1939 amount to £99,307, and the expenses incurred by them in the execution of their duty to £145,666.

Pensions for the Blind

Sir ROBERT YOUNG asked the Minister of Health whether he was satisfied that the purpose for which the pensionable age of a blind person was reduced from 50 to 40 had been realised or whether his attention had been called to the extent by which local authorities had caused the financial benefits of the amended act to be reduced or cancelled; and what steps he proposed to take to give to eligible blind persons the benefit intended for them.—Mr. BROWN replied: It was always contemplated that a local authority in granting financial assistance to a blind person under the Blind Persons Acts would take into account the amount of any old-age pension received by him; and one of the objects of reducing the pensionable age for blind persons was to secure that the burden of providing assistance to blind persons should be shared between the Exchequer and the local authorities.

Exemption from Billeting

Mr. E. H. KEELING asked the Minister whether he was aware that a large proportion of the householders in Harrogate upon whom evacuees had been billeted had submitted medical certificates recommending that they be taken off the billeting list; and whether such certificates were being accepted.—Mr. BROWN replied: I am aware that a number of householders in this district have submitted medical certificates to support a claim to be relieved of the responsibility for accommodating billeted persons. In such cases the householder is informed that he has the right of appeal to the local tribunal set up under the Defence (Billeting Tribunal) Rules, 1939; and it is for the tribunal to decide whether exemption from the acceptance of billeted persons should be granted.

Public Health

From the School Reports

NOTTINGHAM

THE medical inspection subcommittee of Nottingham's education committee in 1940 consisted of eight members, two of whom, the chairman and one woman councillor, are doctors. The staff consists of Dr. Arthur Newth, senior medical officer for education, Dr. R. G. Sprenger, senior assistant, 4 other full-time assistants, 7 part-time specialists, 7 dentists; then there are a part-time psychiatrist, 2 educational psychologists, a speech-therapist and a social worker attached to the child-guidance centre; and finally 8 nurses and a full complement of clinical assistants, dental attendants and clerks. These attend to the medical needs of the 36,000 school-children of the city. In connexion with the evacuation scheme a survey of the children made it possible to test the completeness or otherwise of the record of defective children. Beyond some bed-wetters and children with behaviour troubles, few defectives were found who were not already known. "A large number of cases were reported as having some serious condition such as heart or kidney disease or tuberculosis which was found not to be present when the child was last examined. This supports the idea that the avoidance of invalidism is a not unimportant function of the school medical service." It is of course possible that some of these chronic "invalids" had developed serious disease since their last examination, but presumably the passage means that they had not done so. Generally a survey of children absent from school for long periods reveals that the great majority are not suffering from any disease to warrant their non-attendance, a few are found with lesions which make them suitable for special education which it is the duty of all education authorities to supply, and the remainder, an extremely small number, are either dying or incapable of survival beyond the school-leaving age. The number of children whose lives are wrecked because somebody has detected an innocent heart murmur or albuminuria greatly exceeds that of those destroyed by disease. This is one of the major truths of the school medical service.

Dr. Newth, in discussing the increase of scabies, which Nottingham shared with most parts of the country, recalls that in the last war there was a similar increase often associated with the return of a soldier on leave; but the present epidemic started before the war, even before conscription, and the incidence of scabies in those serving in the Forces in this war has not been severe. He says that scabies occurs chiefly among unclean people, but the connexion is not direct; scabies infection is, in fact, very common in clean people, but in them the mite is soon dislodged, so we very rarely see anything more than a deserted burrow except in the dirty. In contrast to scabies, body lice are rarely found in school-children, even those of the dirtiest and most neglected families. "Towards the end of 1940 one began to notice a deterioration of the clothing of some of the children," but their nutrition was maintained at an excellent level. Dr. Newth says he cannot understand the mentality on the part of a mother "who, having made the brave decision to send her child overseas, withdrew her application when she was told that dental treatment was essential."

SMETHWICK

Dr. Hugh Paul says that the outstanding feature of the year was the continuing high standard of physical and mental health which was maintained throughout. "Even the sustained night bombing of the last quarter failed to have any visible adverse effect on the children." It seems likely that the unprecedented high level of health and nutrition which we reached before the outbreak of war largely accounts for the comparatively slight effect air-raids have had on the health and morale of our people. If so, it means that in the end the butter will beat the guns.

Among 8254 school-children of Smethwick, 74 were in 1940 referred to the chest clinic for suspected or possible tuberculosis. Of these, one was found to have definite pulmonary tuberculosis and one another form of the disease, 61 were excluded as not tuberculosis, and 11 were suspected of possible pulmonary tuberculosis. Suspected pulmonary tuberculosis in children and adolescents is one of the most difficult medical problems of the present day. To make a positive or negative diagnosis where this cannot be better than a guess may easily be disastrous, for if it is wrong it must lead either to unjustified invalidism or to the loss of opportunity to avert a fatal disease. How to keep a suspect under supervision without creating invalidism is a problem medicine has not yet solved, yet in theory it is easy and the most useful work that a physician can do.

KENT

In the second half of 1940 Kent became a battlefield, so what had been a reception area had many shifts in school population. The part of Kent which for education is administered by the county remained in the main a reception area, but the coastal towns which are their own education authorities had many vicissitudes, with the result on the county that though the school population remained fairly constant in numbers, it was much disturbed. Moreover, the county was subject to repeated air-raid warnings, so the children passed much of their time in shelter conditions. Yet, from Dr. J. W. Fox's report, presented by Dr. Constant Ponder, the children's health and spirits did not suffer appreciably, and from the school medical statistics of the year it would not be possible to tell that anything unusual had happened. Dr. Fox gives a brief but most interesting note on the improvement in nutrition of evacuees as measured in terms of growth. This is striking and widespread, and is not wholly explained by the change from town to country life. "The evacuees compare favourably with native children. Perhaps the same can be said where Kent children have gone." Change, in itself, seems to be favourable and Dr. Fox suggests as a permanent feature of education periodic exchanges of children from one district to another.

The Kent dental scheme does not yet make general provision for the treatment of pupils in secondary schools but this is available to some extent. The senior school dentist in his report remarks that in some schools the parents though unable to afford private dental treatment do not take advantage of the clinics with results that are deplorable. "Many of the pupils at these schools present an appalling amount of gross oral sepsis." He attributes this refusal to accept treatment to "a curious form of snobbery, either on the part of the parents or, more frequently, of the children themselves."

From the Annual Reports

CORK STREET FEVER HOSPITAL, DUBLIN

Dr. C. J. McSweeney's report for 1940 is written on a general note of optimism. Amongst 2160 patients treated (a record figure) there was a gross mortality of 5·5%, the lowest ever recorded in the history of the hospital. Gravis diphtheria is apparently still prevalent in Dublin but the fatality (6·5%) shows a slight improvement from the previous year, although clinically the cases appeared to be more severe. This success is attributed partly to the use of "avid" diphtheria antitoxin in certain severe cases, an experiment which has been recorded already in these columns (McSweeney, C. J. *Lancet*, 1941, **1**, 208). Whether one agrees or not with this conclusion, further elucidation and trial of the elusive "anti-B" factor in diphtheria antitoxin remains a matter of impelling interest. Nine cases of diphtheritic respiratory paralysis treated in a Bragg-Paul pulsator did well, but Dr. McSweeney seems hardly justified in asserting that the 48 patients whose recovery has been credited to this machine since 1935 would inevitably have died without mechanical aid to respiration. Streptococcal diseases fared well during the year, there being a trifling mortality (0·87%) in scarlet fever, one death in 20 cases of puerperal sepsis and no death at all amongst 78 cases of erysipelas. Dr. McSweeney does well to remind us how much the modern treatment of erysipelas owes to chemotherapy. Chemotherapy in combination with specific serum was used in the treatment of 30 cases of meningococcal meningitis and 28 recovered, a result for a small series which could scarcely show improvement. Nor could a fatality of 1·83% for 109 cases of lobar pneumonia treated with sulphapyridine and specific serum. Bronchopneumonia alone or in combination with measles or whooping-cough fared less well. Indeed a curiously high fatality of 21·8% in whooping-cough appears almost wholly to have been due to bronchopneumonia, no less than 64 out of the 94 cases treated being so affected.

DUBLIN'S HEALTH.—In an address to a conference of municipal authorities Dr. M. J. Russell, superintendent M.O.H. for Dublin, said that the extension of the city boundaries during the last twenty-five years has increased its area from 7911 acres to 18,777 and its population from 312,750 to 491,800. The density of population has thus been reduced from 38·8 persons per acre to 26 per acre. The death-rate per 1000 in 1915 was 21·8; last year it was 14·5. The death-rate from tuberculosis had fallen by more than half. Credit for the progress in the prevention of tuberculosis, and improvement in general health, was in part due to better housing and wages, and a purer milk-supply. Dr. Russell advocated a system of differential rentals which would discriminate in favour of the tuberculous.

Infectious Disease in England and Wales

WEEK ENDED OCT. 4

Notifications.—The following cases of infectious disease were notified during the week: smallpox 0; scarlet fever, 1217; whooping-cough, 2078; diphtheria, 997; paratyphoid, 87; typhoid, 34; measles (excluding rubella), 715; pneumonia (primary or influenzal), 629; puerperal pyrexia, 151; cerebrospinal fever, 109; poliomyelitis, 31; polio-encephalitis, 2; encephalitis lethargica, 4; dysentery, 108; ophthalmia neonatorum, 80; relapsing fever, 1. No case of cholera, plague or typhus fever was notified during the week.

Deaths.—In 126 great towns there were no deaths from measles, 4 (1) from enteric fever, 1 (0) from scarlet fever, 11 (0) from whooping-cough, 26 (3) from diphtheria, 33 (0) from diarrhœa and enteritis under 2 years, and 14 (0) from influenza. The figures in parentheses are those for London itself.

Birmingham, Wolverhampton and Poole each reported a fatal case of enteric fever. There were 3 deaths from diphtheria at Gateshead. In the same week Dublin had 45 deaths from diarrhœa.

The number of stillbirths notified during the week was 204 (corresponding to a rate of 40 per thousand total births), including 16 in London.

Dr. J. W. Trevan, director of the Wellcome Physiological Research Laboratories, has been elected a director of the Wellcome Foundation, Ltd.

Letters to the Editor

THE CHRISTMAS GIFT

SIR,—Old customs and traditions are greatly valued and treasured by elderly people. Memories of past days are very precious—perhaps none more so than those of happy Christmas days gone by. For many years your readers have most generously supported my appeal on behalf of the christmas gifts fund of the Royal Medical Benevolent Fund and the annual distribution of a gift of 30*s*. has brought great happiness to our beneficiaries, many of whom are old and lonely. I have now been president of the fund for nearly 25 years and would like to thank all who have responded to my appeal in past years and have every confidence that this year the same kindness will be shown. With an additional contribution we could raise our gift this year to £2 instead of 30*s*., which would give much pleasure.

Will contributors please address to "Christmas Gifts," Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, London, S.W.15, and their gifts will all be gratefully acknowledged.

THOS. BARLOW,
President, R.M.B.F.

ENURESIS

SIR,—Mr. Winsbury-White (*Lancet*, Sept. 20, p. 331) has analysed 310 cases of enuresis in an age-group, I gather, of 2–14 years. He finds that in 98% there was a history of at least one of the exanthemata. The significance of this figure is not explained, and I was further mystified when I found that the exanthemata "did not always precede the enuresis." One is reminded of the American surgeon who reported that over 90% of the married women on whom he operated for acute appendicitis had husbands who were cigarette smokers.

Mr. Winsbury-White has also made numerous observations on the normal calibre of the urethra at various ages, by noting the size of the largest instrument which will lie in the urethra without being gripped. Is the passage of sounds into the urethras of normal children of both sexes a psychologically justifiable procedure? He found, in 70% of these patients on whom he performed cystoscopy, inflammation of the trigone and the internal urinary meatus; and in 76% of those in whom the posterior urethra was examined, inflammation of this too. "Several cases with chronic coliform infection had so much dilatation in the upper urinary tract that the infection was obviously a complication of urinary stasis," but of the cases examined by urography "60% showed abnormalities in the upper urinary tract which, though slight, indicated early changes due to the chronic inflammatory process below." It would be interesting to know how he differentiates these apparently opposite groups. He adds, "Where the dilatation was without remedy so was the infection." In the light of the recent work of Helmholz and others at the Mayo Clinic, one would like to know what methods of treatment were tried before the infection was finally regarded as without remedy.

Lastly, he states that "the paraurethral glands of Skene and any glands (except those of Bartholin) which open directly into the urethra are the homologues of the glands of the prostate." The glands of Bartholin do not open into the urethra, but lateral to the hymen between its attached border and the labia minora. The homology of the prostate is a more complex business than the statement suggests, but in any case the next phrase ("and an infection of the vulval glands automatically involves the urethral glands") appears to be a non sequitur.

His observations, and the treatment that follows rationally from them, are of such importance that they deserve discussion. I want especially the pædiatrists to tell me whether the 97% who received benefit from urethral dilatation might not have been cured by the threat that "next time you do it, you'll have those things shoved up you again." Perhaps the 3% who obtained no benefit rather enjoyed the process.

Whitchurch, Aylesbury. RAYMOND GREENE.

SIR,—In 1918 I published a study on enuresis based on several thousand cases of all ages and I may therefore claim to be familiar with this disease. Mr. Winsbury-White

seems to be under the impression, that an inflammation of the lower urinary tract is in most cases causally connected with enuresis. He does not mention the many other causes which produce this symptom—for example, the disturbance of the nervous control of the detrusor and sphincter muscles of the bladder, spina bifida occulta, epilepsy, idiocy, threadworm infection, onanism, and in a certain number of cases simple laziness and indifference. There are also large numbers of patients of all ages in whom none of these causes can be found, and who form the group of "enuresis sui generis." These patients have insufficient tone in the sphincter muscle and defective nervous conduction between bladder, spinal cord and brain. The contractions of the detrusor muscle under the influence of the full bladder are not considerable enough to wake the patient. Those cases in which every other form of treatment—whether by suggestion, drugs or instruments—had failed I treat with 3–4 epidural (sacral) injections of 30 c.cm. of saline, achieving immediate success in 85% and ultimate success in 68%. The injection causes a mechanical irritation of the lowest part of the spinal cord with its nerves to the bladder and the sexual organs. In men, priapism lasting several hours is often caused, and if cystoscopy is performed shortly after the injection hyperæmia of the lower half of the bladder which did not exist before is found in most cases. The patients feel the need to micturate more imperatively, and this wakes them up before they have passed urine. Lasting success I believe to depend on a kind of education of the bladder, comparable to the training of bowel action. Diet is also important as my cases fell to a quarter of the number when the fat deficiency of the last war was relieved in 1919 by the arrival in Germany of bacon from America. I agree with Mr. Winsbury-White that hyperæmia and chronic inflammation of the trigone and the neck of the bladder are common in adult women, and I published two papers on this as a cause of frequent micturition in 1905 and 1906, but I have generally found no evidence of such inflammation in children, with or without enuresis. Might not the hyperæmia be caused by the instruments inserted? The absence of every microscopic sign of infection in the urine of 85% of his cases seems to suggest this explanation, since in real inflammation of the neck or the trigone of the bladder a few leucocytes are always to be found.

ARNOLD HEYMANN,
Bensham General Hospital, Gateshead. Late Consultant Urologist at Luisenspital, Düsseldorf.

BIPP AND ITS FRIENDS

SIR,—I was very pleased to see your leader on the use of bipp, for to many of us who have used it in thousands of cases in this war and the last it still remains the treatment of choice. One great advantage, which you do not mention, is the ease and painlessness of the dressings; a man who is desperately ill and septic cannot stand the pain of removing a dressing that is sticking badly, or, on the other hand, a daily anæsthetic. This makes the treatment highly popular with the patient himself; he can eat his dinner after his dressing and there is not that rise of temperature due to opening up fresh paths of infection which must occur when the removal of the dressing causes bleeding from the granulating area. Any pus can escape quite easily between the wound and the gauze well "buttered" with bipp. If after excision of the wound, designed to leave as far as practicable a funnel-shaped cavity, a bipp-covered plug of gauze is carried lightly to the bottom of the wound, no dressing need be done as a rule for 2 or 3 days. The plug is then removed and never replaced; the oily layer left in the track will keep it well open and allow free drainage. It will rarely be found necessary to reopen the wound and in many cases it is possible to do a secondary suture in 7–10 days.

The bogy of bismuth poisoning is easily laid. I first heard of bipp when on leave from France in the last war, before, I think, any account of it had been published. Either my informant got the formula wrong or my memory luckily let me down and our bipp was made from bismuth carbonate 2 parts and iodoform 1 part. There is no reason whatever to use the nitrate, which is well known to have dangerous properties; the carbonate is absolutely safe and as much as 6 oz. used to be given for bismuth meals before barium came into its own. I have seen trouble from Morison's formula but never from the carbonate, while the lessened amount of iodoform also precludes any risk of iodoform poisoning, which did occasionally occur. During this war we have added 10% of sulphonamide powder and so greatly increased its value. Bipp used with bismuth carbonate is safe, effective and will please both surgeon and patient. I hope it will at least be given a trial by any surgeon who has not used it.

Southampton. H. JOHN NIGHTINGALE.

HOME GUARD PROBLEMS

SIR,—The views lately expressed on medical arrangements in case of invasion diverge on minor details of organisation and equipment needed but all are fairly unanimous about the existing position. Most correspondents agree that the arrangements made are totally inadequate; that the equipment issued is rudimentary; and that the little preparation that has been made is unsuitable to meet the conditions that can reasonably be expected during an attempted invasion.

It is six years since the shadow of war was first discernible in England (the A.R.P. Department of the Home Office was established in 1935). It is three years since every intelligent Englishman was convinced that war would have to be waged to stop German aggression and that all civil defence measures must be pushed to the utmost. It is over two years since the outbreak of war and it is more than a year since we were told that invasion should be expected at any time. After all this, suddenly to discover that our casualty arrangements made for invasion are practically non-existent can only lead to one of two conclusions. Either the criticisms levelled have no basis of reality and are therefore extremely harmful to morale, or responsible officials have been guilty of an oversight or lack of efficiency. The articles and letters calling attention to the lack of preparations are written by doctors engaged in Home Guard, civil defence and so on, who are therefore specialists in their fields with the facts at their disposal. One may quarrel with their conclusions but the picture they paint looks accurate. Are the arrangements which they think necessary in fact essential, and if so was it humanly possible to make the necessary provision before this?

Casualty services, besides their humanitarian aspect, have a direct military value, for they are essential to the sustenance of morale. It is questionable whether successful defence can for long be carried on if the medical service has broken down. At times soldiers may have to be asked to fight to the bitter end, even without a casualty service, and they will do this if they understand the reason why and do not feel that the lack arises from inefficiency on the part of those responsible for their welfare. In England where successful defence is so inextricably mixed up with proper morale the need for proper medical arrangements is vital for security reasons.

Was it, however, possible to make those arrangements? It can be argued that we had to expend our maximum effort on munitions production, fortifications and military training. This may be so, but even the manufacture of a million tanks and 24 hours a day training need not have prevented doctors and administrative officers pushing on their preparations to the utmost, for these are independent of the others. It may be said that medical services do not depend only on medical men and organisation, but that precious equipment is also needed and this could not be manufactured because of other calls on the factories. But A.R.P. and E.M.S. preparations were based on estimates and sustained casualty figures which were incomparably greater than any met so far or likely to be met for a long time to come. Equipment, then, has been prepared for all the casualties we may get, the only objection being that all our organisations and equipment are concentrated in the industrial areas, whereas Home Guard casualties will mainly occur in rural areas. It seems to have been forgotten that the Home Guard are our own civilians who have taken up the rifle in defence of their homes. As soon as it became apparent that the threat of invasion was changing the tactical picture of defence plans should have been reviewed and necessary steps taken to regroup our dispositions and redistribute

our equipment. Both personnel and equipment are there, but bureaucracy and lack of foresight have prevented their being put where the danger is most likely to occur and made flexible enough to meet the new offensive strategy. The successes of the Nazis have come from their speed and unexpectedness. Our defence must be planned with this fact in mind.

Whose responsibility was it to make those arrangements? The Ministries of Home Security and of Health could perhaps have claimed that the Home Guard being military falls properly within the province of the R.A.M.C. This would be a short-sighted view, for the R.A.M.C. is but a limb of the Army, and the Army will always remain mobile; it may at any time again become an expeditionary force. The Home Guard was built to meet a need the Army could not meet, except at the risk of undue dispersal. It always remains static within its township and its casualties will be inextricably mixed with those of the civilian population. It must therefore remain a medical responsibility of the E.M.S. at any rate until the War Office decides to take over the whole civil defence of the country.

The Prime Minister said in his recent speech at County Hall that he is advised that our civilian preparations are being pushed to the utmost; that as a result of experience changes have been made and everything possible is being done. Can we have overlooked the medical arrangements in case of invasion?

Battersea. G. B. SHIRLAW.

SIR,—In your issue of Oct. 11 (p. 442) Brigadier Cowell turns his guns, wanton and unprovoked, on the Home Guard Medical Service, which has distressed him by using the expression C.C.P. (casualty collecting posts) to describe the posts which it arranges for the reception of its own casualties. Being to some extent responsible for that term I join issue with him at once. Practical experience of conferences with the civil authorities shows that they do not understand the nature of military posts unless those posts which are really distinguished in equipment, control and function are also distinguished by different names. The civil authorities meet with exactly the same difficulty when dealing with the military, most of whom are unaware of the essential differences between a first-aid point and a first-aid post. In vain does Brigadier Cowell proclaim that the initials C.C.P. are "confusing, redundant and unnecessary." So long as he requires three separate sets of initials to describe his own regimental posts—F.A.P., C.A.P. and even P.A.P. (platoon aid post)—he is in no position to rage about the mote in his brother's eye.

GORDON WARD,
Sevenoaks. Lieut.-Colonel, H.G.

PLUMP TYPE OF GRAVES'S DISEASE

SIR,—The paper under this title by Dr. Trotter and Mr. Eden in your issue of Sept. 20 I feel calls for some comment, since it results in making certain generalisations which are scarcely justified by the evidence. Familiarity with toxic goitre in all its many manifestations teaches that there is no classical sign of the clinical complex described by Graves which may not be absent, and it is dangerous to make any attempt to separate off any particular category as being fundamentally different from the rest. The medical officers who have worked in recent years at the L.C.C. thyroid clinic at New End have been familiar with the toxic patient who has not lost weight or may even have gained. Among several hundred patients treated by partial thyroidectomy there have been many more "plump" individuals than are recorded by Dr. Trotter and Mr. Eden, yet I do not recall that any deaths have taken place among them. As pointed out by Dr. Page in your issue of Sept. 27, death in these particular instances may have been due to some cause quite unconnected with the type of patient, and it seems to me to be entirely misleading to make a general statement that the type entails special dangers on evidence derived from so small a number. Lymphoid hyperplasia is common in all types of toxic goitre.

In addition to this it is, in my opinion, misleading to suggest that the results of thyroidectomy are likely to be uniformly worse in the "plump type" than among other patients. It is well known that the results are, in general, much less dramatic among the "atypical" categories (including the plump patients) than among the classical examples of "Graves's disease," and there is room for judgment in forming an opinion for or against operation. Nevertheless the more slowly obtained benefits are usually well worth having in the long run, and the delay is no argument for withholding treatment.

If I were to apply the principles of generalisation used by the writers of the article I might maliciously point out that among their seventy patients the mortality has been more than four times as high as it ought to have been. Let the causes for this be fully investigated, but I should anticipate that this mortality will not be repeated when the numbers treated in their clinic have materially grown.

Wendover. GEOFFREY KEYNES.

NATIONAL HEALTH ASSOCIATION

SIR,—I should like to bring to the notice of your readers the objects of the National Health Association, formed on Aug. 22 at Tunbridge Wells. It must be evident to the profession that big changes in medical and hospital practice will come about after the war, more especially since the Minister of Health has said that voluntary hospitals will receive aid from local authorities. At the second reading of the National Health Insurance, Contributary Pensions and Workmen's Compensation Bill in July many Members of Parliament expressed their strong disapproval of the medical benefits allowed to insured persons, and also of the lack of diagnostic and treatment facilities in insurance practice. The National Health Association was formed so that the public and medical profession could get together and solve, without interference from outside sources, such as vested interests and political parties, the problems that affect their common interest.

When the National Health Insurance Act was passed in 1911 doctors and the public became conscious of medical politics, or of the interest that the state was now going to take in the administration of medical benefits and the profession. This state interference forced medical men to find a refuge from the Government and the politician in the B.M.A. and the Medical Practitioners Union, but even after 30 years little or nothing has been accomplished for either the profession or the public. For obvious reasons the profession was not represented in the House of Commons as a political entity, and, except for a small number of doctors representing their respective parties, legislation from a purely medical viewpoint and also that of the sick man was impossible to implement. A square deal for the doctor and the patient was almost impossible, leaving the question of the remuneration of the profession in its present state and no special facilities available to the public, other than through the already overworked voluntary hospitals. Thus the whole subject of specialist medical benefits and remuneration in N.H.I. practice was left to the B.M.A. and the M.P.U. to adjust, which they have not yet been able to do. This I feel has been due to the fact that they deal directly with the Ministry of Health, an administrative body, and not with a legislative chamber. Parliament alone can solve this problem and the objects of the National Health Association are to educate the public and Members of Parliament in what the doctors and people desire and thus get legislation passed that is acceptable to all concerned. The association will make it possible for doctor and patient to sit round a table and discuss problems affecting on the one hand the economic position of the profession and on the other modern diagnostic and treatment facilities, clinics and hospitals which come within the scope of post-war reconstruction. It is hoped that, by means of properly directed propaganda, controlled by the profession and the public, the association will be able to influence public and parliamentary opinion, thus obtaining through Parliament a modern and efficient national medical service that is acceptable to all. The association is meeting with support throughout the country and although only a newborn child is rapidly expanding. I should be pleased to send a copy of its memorandum to any interested reader.

E. F. ST. JOHN LYBURN.

Hastings Clinic, Ferndale, Tunbridge Wells.

LIGHTING OF WARDS

SIR,—After the war many hospitals will be remodelling their wards and the experience at the Moreton District Hospital may help in designing lighting systems. This hospital built two new wards in 1935 and for general lighting individual bed lights with additional central lighting was adopted; this is very satisfactory but care should be taken to fit the individual bed lights sufficiently high on the wall so that they cannot be smashed by a crane attached to the bed. For lighting during the night the matron, Miss M. B. Ockenden, suggested that the wards should be lit by concealed lights such as are used on the stairs and corridors of cinemas, and this idea was adopted. A fitting, the "Major Flush Louvre Light" (manufactured by Manjor Equipment Co.), was let into the wall where it would be underneath a bed, 1 ft. 8 in. above the floor. At this height the louvred openings are just below the level of the bed and the light cannot be directly seen by any patient in the ward; at the same time they illuminate the polished floor completely and the reflected light makes objects on the beds and lockers quite visible. This fitting could be improved, for the replacement of burnt-out bulbs is troublesome and the lowest power of bulb available is 15 watts, which is too high. Five of these were fitted in a ward of 12 beds 55 ft. 6 in. × 20 ft. and gave more light than is required; one light to 300 sq. ft. should be sufficient. This system of lighting has since been copied in the Acland Nursing Home and the Nuffield wards of the Radcliffe Infirmary at Oxford.

Moreton-in-Marsh. CLARK NICHOLSON.

OIL FOR FLOORS

SIR,—We were interested to read Dr. J. M. Twort's letter of Aug. 16 (p. 205) in which he pointed out the carcinogenic properties of spindle oil, and the danger which may therefore be associated with its use as a dust-layer on hospital floors. The term "spindle oil" is used to cover a wide variety of mineral oils of varying degrees of refinement, ranging from the relatively crude, carcinogenic lubricants employed in cotton mills to the highly refined, biologically inert white oils and the new paraffinum liquidum leve B.P. Cost is a useful indication of the degree of refinement of these oils, the more highly purified oils costing 2*s*. 6*d*. per gallon while the cruder ones may be obtained for less than half this amount. The extent of the danger of using "spindle oil" as a dust-layer depends on the degree of refinement of the oil used and the frequency with which it is applied to floors, so that care is necessary in selecting an appropriate oil. We have always used a well-refined oil of the more expensive type, the specifications of which we have defined (*Lancet*, 1941, 2, 123). Dr. Twort informs us that this oil is unlikely to be harmful, and we consider, therefore, that the danger associated with the application and presence of spindle oils of this nature on hospital floors is negligible. Should circumstances necessitate a prolonged and intimate contact of the skin with the oil before and after it is applied to the floors the still more highly refined oils may equally well be used. These oils are equally efficient dust-layers, but are slightly more expensive that the spindle oil we have used. Dr. Twort has kindly tested such an oil for us (Technical White Oil refined by the Manchester Oil Refinery, Ltd.) and found it to be biologically inert. It was the consideration of the carcinogenic properties of the cruder oils which led us to recommend the more highly purified oils for dust-laying on bedclothes, where intimate contact between the patient's skin and the oil is inevitable.

M. VAN DEN ENDE.
JOHN C. THOMAS.

National Institute for Medical Research.

THE GOVERNMENT AND PROPRIETARY MEDICINES

SIR,—At the recent annual general meeting of Beechams Pills Ltd., the Chairman said (as reported in the *Times*):

"For the ninth successive year our trading profits show an increase. The profit for the year amounts to £1,085,893. . . .

"The company's normal trade both at home and overseas, without accounting for Government contracts, shows considerable expansion. . . .

"Since we last met, Parliament has passed the Pharmacy and Medicines Act of 1941. . . . Generally, it is hoped that the new Act will improve the status of proprietary articles and patent medicines. The directors have decided that the full benefit shall be given to the public. . . ."

As regards the Government contracts mentioned, the Financial Secretary to the Treasury, in reply to Sir E. Graham Little, M.P., said on Sept. 30: "So far as I have been able to ascertain, no Government department has a contract with this firm." I think the profession is entitled to know which of these two statements is correct.

Leicester. N. I. SPRIGGS.

RADIOLOGY AS A CAREER

SIR,—It is with surprise that I read of the novel scheme for producing radiologists, revealed in your annotation of Oct. 11 (p. 432). It is difficult to appreciate the reason for the unusual step that is being taken, unless a shortage of radiologists is upon us. At present there is no evidence that such is the case. I have recently been informed that no radiologists are required by the E.M.S., and as the Services will not take them without considerable clinical and radiological experience, the new candidates will not find their path as rosy as would appear at first sight. In any case it seems a retrograde step to be subsidising would-be specialists when, to my knowledge alone, three qualified radiologists are unable to find work. Radiologists have many trials to undergo because their specialty is a junior one, but I am surprised that my senior colleagues have not resisted this unnecessary attempt to induce people to join their ranks, for it cannot enhance our prestige.

D.M.R.E.

HAD THE CERTIFYING DOCTOR KNOWN

SIR,—At a recent gathering of doctors at a steel works the topic of certification of employees in industry came under discussion, and the company had received an urgent request for help to manufacture a part for a war machine. The shortage of this component was causing a serious delay in supplies. It so happened that there was in one shop adaptable equipment but no skilled operatives available. In reviewing the labour force it was remembered that three men who were skilled at this type of work had been transferred several years before when orders were short to other departments. They were requested to report back the following week to their original shop. Two days later they presented medical certificates, each bearing a different doctor's signature, giving some reason for their not transferring to the operation required. I felt satisfied that the real cause of the trouble was not a question of health. The men had settled down to a new occupation with a fresh set of men, in surroundings which happened to be more congenial, and they were displaying the understandable and common dislike of being uprooted and disturbed. I interviewed the three men and they all seemed to be in normal health. I pointed out to them that, although the work that they were at present doing was of importance, the work to which they were requested to transfer was particularly urgent and vital and that their greatest utility value to the country on this occasion would be to return to their original occupation. Two of them, on considering these points, immediately volunteered to do as we wished. The third man disclosed that he had lost a sister and brother from tuberculosis and that as the original shop was certainly dustier than his present shop he did not want to return. It was apparent that his fear was quite genuine. It was, however, pointed out to him that if he had a liability to tuberculosis probably the shop that he was working in was not the most suitable: that open-air work would be preferable, and that in any event he ought to have enough courage to have an examination before it was too late for his doctor to help him. To this he reluctantly agreed and it was arranged that he should be examined by the local tuberculosis officer. The result of this examination was not reported, but ten days later the man presented himself for work in the occupation that he had been requested to take up, and he was a happier man than he had been for some years past.

That is what happened; but if this satisfactory conclusion had not been reached the problem would have

been different. Even supposing twelve able-bodied men from the Ministry of Labour had been available—which was out of the question—it would have been fortunate if as many as three of them could have adapted themselves to the work, which calls for considerable dexterity and stamina; and those three men would have taken at least two or three months before they could have given the output that the original three men actually gave in a few days. I was urged to pass these particulars on to you. I do so, with some reluctance and with the feeling that had the certifying doctors known all the facts the situation would never have arisen. It is, however, worth considering how such events can best be avoided.

WORKS MANAGER.

Obituary

JAMES KERR

M.D. CAMB., D.P.H.

BY the death in Edinburgh on Oct. 5 of Dr. James Kerr in his 80th year the country has lost its Grand Old Man of school hygiene. It was in Bradford that he initiated what was to become a vast instrument of human welfare, and when the B.M.A. met there in 1924 the president described him as "a brilliant scholar who never realised how brilliant he was even when it was impressed upon him by others." But for his epitaph he would have chosen: "the first school medical officer for London."

James Kerr was born in Glasgow, educated at Manchester Grammar School, St. John's College, Cambridge (of which he became a fellow) and St. Bartholomew's Hospital, qualifying in 1887. He took up the double specialties of eye and ear surgery and after hospital experience at Swansea and elsewhere he started practice in Bradford. The school board of this town (Margaret McMillan was then a member of it) was the most progressive in the country and employed Kerr as consulting medical officer. He was thus the first medical man in England (with the possible exception of Clement Dukes) to pay attention to the physiological questions arising out of the practice of confining children within walls and seated at desks during long periods each day during a time of their life which should naturally be spent largely in activity in the open air. His investigations produced new and vital knowledge of the reactions of children to these artificial conditions and paved the way for the advances in school practice which took place in the first two decades of the century. The fruit of these early researches was published by the Royal Statistical Society, which awarded him the Howard medal, and in the Ingleby lectures delivered at the University of Birmingham.

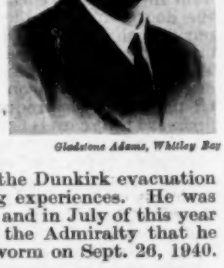
In 1902 the school board for London, alarmed at the evidence of widespread defect among the elementary-school population, determined to create a medical department and Kerr was appointed as its head. He thus became the first whole-time school medical officer in the country and he made full use of the opportunity thus created. He possessed exceptional powers of leadership and gathered around himself a band of brilliant young specialists whom he fired with his own enthusiasm. His conception of school hygiene was broad and inclusive; medical inspection and treatment, with which the idea became linked in many minds, was for him far too narrow an interpretation. He thought in terms of the whole child and of its primary requirements, physical and mental, for a healthy life. His mind worked always as an educationist, rather than as an officer of the public health concerned primarily with the prevention of disease, and he had a keen understanding of the social implications of his work. Thus he created a school nursing service, started the open-air school movement, and engineered a series of reforms in educational methods. Slates and pencils disappeared, fine work in infants' departments was abolished, sewing by artificial light prohibited, sight-saving classes established, and personal cleanliness insisted upon. And on the work done in London under his direction were based the legislative enactments which later established the school medical service throughout the country. In 1911 the London County Council, which had superseded the school board as education authority, decided to amalgamate under one head all the medical services under its direction and Sir William Hamer thereupon became school medical officer. Henceforward until his retirement in 1926 Kerr occupied the post of research medical officer to the council and was freed from the trammels of office routine. He was then able to devote much of his time to literary work. He re-wrote Newsholme's "School Hygiene," the standard textbook on the subject; his life-long interest in the hygiene of the special senses found expression in a monograph on "School Vision and the Myopic Scholar"; and finally he published "The Fundamentals of School Health," a volume packed with concise information and revealing between the lines some of the idealist's dreams of the future.

After his retirement, spent in Edinburgh, Kerr's interest in school hygiene never flagged and many masterly reviews came from his pen. His mind remained acute and active to the end. During later years he identified himself with the care of the deaf in Scotland, becoming chairman of Donaldson's Hospital. He is survived by his wife and his son, Dr. Douglas Kerr, principal police surgeon to Edinburgh Corporation.

ARTHUR CHARLES SHELFORD

M.B. EDIN.; SURGEON LIEUTENANT, R.N.V.R.

Arthur Shelford was born in 1914 at the Duke's School, Alnwick, where he also received his early education. In 1932 he began his medical studies at Edinburgh University and he graduated M.B. in 1937. After holding resident posts at Sunderland Infirmary he joined the practice of one of his chiefs who writes of him: "Shelford was rather shy but the more one knew him the more one liked and respected him. He had sound principles of conduct and the character and will power to put them into practice. Conscientious and interested in his work he would have made an excellent practitioner, and many of his patients still talk to me about him. He was devoted to his home, Northumberland and the Cheviots." Dr. Shelford volunteered for the Navy at the outbreak of war and received his commission as a surgeon lieutenant at the end of 1939. Early the next year he was posted to H.M.S. *Express*, and during the week of the Dunkirk evacuation had some strenuous and exciting experiences. He was reported lost in September, 1940, and in July of this year the German authorities notified the Admiralty that he was buried on the island of Pellworm on Sept. 26, 1940.



Gladstone Adams, Whitley Bay

THE LATE PROF. AGNES COWAN

Dr. Agnes Cowan died at Cambridge on Aug. 22, 1940, after she had been invalided home from China, and her friends will welcome some notes of her career which we have now received. Agnes Marshall was the daughter of Sir John Cowan, well known as a steel engineer. She was educated at the University of Edinburgh where she qualified in 1906, and within a year of her graduation she set out for Ashiho, the most northerly mission post in Manchuria. Shocked by the misery and wastage of women's lives she began almost at once to tackle the barriers of ignorance and prejudice, and before she returned to this country during the last war she had built up at Ashiho a women's hospital and had trained women to carry on her work. Back in this country she served women again at the factories at Gretna and in the camps of the W.A.A.C.s. When she returned to China after the war she was called to Moukden to superintend the women's hospital and practise in her own specialty. The medical college appointed her to the chair of obstetrics and gynæcology, and lectures, all of which had to be delivered in Chinese, were added to her busy life. Her courage, integrity and wit appealed to the Chinese, and she counted their friendship as her reward for thirty years of service.

Medical News

University of Cambridge

The title of the degrees of M.B. & B.Chir. has been conferred on J. I. Hallinan (Girton) and J. W. Shrimpton (Newnham).

In the examination for part II of the D.M.R.E. Dr. John Morton has been successful.

University of Sheffield

Dr. Margaret Happey has been appointed assistant bacteriologist, and Mr. F. Dickens, D.Sc. director of the Cancer Research Laboratory, Newcastle-on-Tyne, has been appointed external examiner in biochemistry for the Ph.D. Thesis. Prof. G. A. Clark has been elected to represent the university on the General Medical Council.

Royal College of Surgeons of England

At a meeting of the council held on Oct. 9, with Sir Alfred Webb-Johnson, the president, in the chair, Mr. D. L. Kerr was admitted as a Macloghlin scholar.

Dr. John Beattie was appointed Bernhard Baron research professor. It was decided not to fill the post of Conservator of the Museum at present, and Dr. A. J. E. Cave, assistant conservator, will continue in charge for the time being.

Dr. A. D. Marston, L.D.S., was appointed an additional examiner for the diploma in anæsthetics.

A Prophit studentship has been awarded to Dr. J. Clark Davidson, and a Mackenzie Mackinnon research fellowship to Dr. Geoffrey Bourne.

It was decided to recognise the posts of resident surgical officer and of one house-surgeon at the Kent and Sussex Hospital, and of house-surgeon at the Walsall General Hospital, for the six months' surgical practice required of candidates for the final fellowship examination.

A diploma of fellowship was granted to Peter Smith, M.B. Lond., and diplomas of membership to François-Xavier Darne, J. D. C. Gowans, D. K. Sambrook, A. L. H. Smith and Glenys J. Wade. Diplomas in child health were granted, jointly with the Royal College of Physicians, to the following:

A. W. Abramson, W. W. Burnett, Winifred M. Davidson, W. G. Daynes, Mabel A. Henderson, S. L. Mohan, David Morris, Lorna C. Petersen, Gaya Prasad, I. D. Riley and Margaret M. Strange.

Royal Faculty of Physicians and Surgeons of Glasgow

At a recent meeting of the faculty, with Mr. Roy Young, the president, in the chair, the following were admitted to the fellowship:—

J. W. Ferguson (Gartcosh), H. R. MacLennan (Glasgow), Thomas Semple (Newton Mearns), and H. E. C. Wilson (Bearsden).

Medico-Legal Society

A meeting of this society will be held at 26, Portland Place, London, W.1, on Thursday, Oct. 23, at 4.30 P.M., when Dr. Thomas Christie, medical officer of Winchester Prison, will read a paper on the manic depressive psychoses in relation to the crime of murder.

Priority Milk

The Ministry of Food will allow priority claims on the supply of liquid milk up to two pints a day for periods normally not exceeding one month by the following people:

(*a*) Workers, including domestic workers, during an illness which temporarily incapacitates them for work.

(*b*) Persons suffering from an illness characterised by high and prolonged fever or from post-operative conditions after major operations.

(*c*) Sick children not attending school.

(*d*) Persons suffering from one or more of the following illnesses, whether incapacitated or not: Active tuberculosis of all types; silicosis, affection of the mouth, throat or gullet or organic nervous disorder causing interference with swallowing; gastric, duodenal or anastomotic ulcer; certain cases of dyspepsia due to conditions other than ulceration of the stomach or duodenum; colitis; diabetes mellitus; thyrotoxicosis; nephritis.

(*e*) Expectant mothers, who are allowed a priority claim of one pint a day until approximately one month after confinement.

A certificate signed by a medical practitioner will be required, except by an expectant mother, for whom the certificate of a certified midwife or health visitor will be accepted.

Infants between one and twelve months old who are being bottle-fed on cow's liquid milk will be supplied with up to 7 pints a week, in addition to their priority entitlement of 7 pints a week under the milk supply scheme. The additional quantities must be bought at the full retail price.

Memorial to St. Thomas's Masseuses

A war memorial fund is being formed in memory of the four staff masseuses who lost their lives when St. Thomas's Hospital was bombed in September, 1940. It is suggested that funds for four bursaries should be raised to help students in the physiotherapy department, to be awarded as follows:

In memory of Barbara Mortimer Thomas—primarily for a student from the Dominions.

In memory of Gwendolen Lockyer—primarily for the daughter of a medical practitioner.

In memory of Marguerite Doucet—primarily for the daughter of a past or present member of the Services.

In memory of Stephanie Dunn—primarily for the daughter of a clergyman.

Donations should be sent to Miss M. Randell, at the massage department of St. Thomas's Hospital, S.E.1.

Lister Medal

The Lister medal for 1942, which is awarded in recognition of distinguished contributions to surgical science, has been granted to Prof. Evarts A. Graham, professor of surgery in the Washington University (St. Louis, Mo.), and he will deliver the Lister memorial lecture in 1942, or later, under the auspices of the Royal College of Surgeons of England.

Royal Society of Medicine

On Tuesday, Oct. 21, at 2.30 P.M. at the section of comparative medicine Mr. H. W. Steele-Bodger, M.R.C.V.S., will open the first of a series of discussions on the general principles involved in a campaign to control diseases of cattle inimical to man. At 5 P.M. on the same day there will be a general meeting of fellows, and on Thursday, Oct. 23, at 4 P.M., the section of urology will hold a clinico-pathological meeting. On Friday, Oct. 24, at 2.30 P.M., Dr. Donald Paterson, Dr. Richard Dobbs, Sir Lancelot Barrington-Ward and Mr. David Levi will open a discussion at the section of disease in children on pyloric stenosis in infants. At 3 P.M. on the same day Dr. E. H. R. Harries will deliver his presidential address to the section of epidemiology and state medicine. He will speak on the trend of fever hospital practice.

Among the victims of German reprisal in Czecho-Slovakia is, we are informed, the chief of mental hospitals in Prague, Dr. F. Kafka, who was also director of the psychiatric clinic in the German University there.

Births, Marriages and Deaths

BIRTHS

BOUCHER.—On Oct. 6, at Woking Maternity Home, the wife of Dr. Anthony Boucher—a son.

BROWN.—On Oct. 8, at St. Albans, the wife of Dr. G. L. Brown—a son.

EDHOLM.—On Sept. 26, at Belfast, the wife of Dr. O. G. Edholm—a daughter.

GILBERT.—On Oct. 6, the wife of Dr. R. G. B. Gilbert, of Barnstaple—a son.

GURNEY.—On Oct. 8, at Windsor, the wife of Captain James Gurney, R.A.M.C.—a son.

HAMILTON.—On Oct. 11, at Monk's Orchard, Beckenham, the wife of Dr. J. G. Hamilton—a son.

INNES.—On Oct. 6, at Liverpool, the wife of Mr. Alexander Innes F.R.C.S.—a son.

SWAYNE.—On Oct. 3, at Hitchin, to Dr. Margaret Swayne, (née Peggy Blenkin), wife of Captain D. H. Swayne, R.A.M.C.—a son.

TEMPLETON.—On Oct. 1, at Midhurst, Sussex, the wife of Dr. William Templeton, of Chichester—a son.

MARRIAGES

BELLIS—RICHARDS.—On Oct. 11, at Leicester, Gordon Worsley Bellis, L.R.C.P., Flying-Officer R.A.F.V.R., to Barbara Irene Richards.

BOOTH—DENNY.—On Oct. 11, at Sydney, Robert Philip Booth, M.B., surgeon-lieutenant, R.A.N., to Winifred Daphne Denny.

DUERDEN—ALLAN.—On Oct. 11, at Port Glasgow, John Wilson Neander Duerden, M.B., captain, R.A.M.C., to Grace Pride Allan.

LEDWARD—COLYER.—On Oct. 11, at Charing, Alexander Davenport, Ledward, M.B., lieutenant, R.A.M.C., to Margaret Leith Colyer.

MACALPINE—HIRSCHMANN.—In October, George Lawson Macalpine, of Accrington, to Ida Hirschmann, M.D., formerly of Harley Street, London.

MACARTNEY—CAREY.—On Oct. 11, at Bromley, Kent, James Norman Macartney, M.D., major, R.A.M.C., to Phyllis Susannah Carey.

DEATHS

MILL.—On Oct. 8, at Keswick, Thomas Mill, C.M.G., C.B.E., M.B. Edin., F.R.C.S.E., F.R.A.C.S.

O'CONNELL.—On Oct. 2, at West Moors, Dorset, David Valentine O'Connell, M.D.R.U.I., D.P.H., colonel, late R.A.M.C., aged 83.

THURNAM.—On Oct. 8, at Hayle, Cornwall, William Rowland Thurnam, M.D. Durh., founder of Nordrach-upon-Mendip.

PRINT IN BINDING

Notes, Comments and Abstracts

BLOOD TRANSFUSION IN THE FINNISH WAR

Dr. Erik Unonius and Dr. Inga Schröder (*Nord. Med.* 1941, **10**, 1046) tell us something of the problems encountered by the Finnish blood-transfusion service in the Russo-Finnish (as distinct from the Finno-Russian) war. Many of the donors moved away from their homes during the early months of war and it became necessary to enrol new ones in large numbers in order to have a supply available for emergencies. Donors are only accepted if the results of general examination, Wassermann and Kahn tests, and the sedimentation-rate are favourable. Blood is taken directly into the transfusion apparatus. Vichy-water bottles fitted with a special stopper were found to be satisfactory for the purpose. The donor's hæmoglobin was estimated before the blood was taken, and it was found that the figure did not return to normal within 7 weeks of blood-taking. The rate of restoration varied greatly between donors. Men between 26 and 35 and women between 35 and 45 made up the loss most quickly, though elderly donors tolerated the loss of blood well. Only group O blood was sent to the front, since grouping was impossible there. Blood of other groups was used at the base hospitals as far as possible. In field hospitals and casualty stations a mixture of equal parts of blood and normal saline was found to be the most useful for transfusion. Stored blood showed similar changes whether treated with citrate or heparin. The red cells were very resistant, but the whites disintegrated rapidly. After 5 weeks the red cells were only down by 14%, but after a fortnight there were no undamaged white cells left. According to Unonius and Schröder the destruction of white cells releases albuminous products in the blood which may account for the rigors occasionally seen. The sedimentation-rate decreased rapidly, and after 2 weeks was 0 mm. in one hour (Westergren). Blood-sugar fell quickly to a third and then remained constant. The hæmoglobin percentage fell a little in the first week and then became steady. Blood stored for 3 months was used for transfusion in two cases with no ill effects.

HE'S A GOOD BOY

THE Cockney mother who went to the police-court to plead for her son put the idea of the Hawkspur camp in a nutshell: "He's a good boy, yer honour, bar what he does." But in "The Hawkspur Experiment" (Geo. Allen and Unwin. Pp. 192. 6s.) Mr. David Wills describes in greater detail the attempt made at this voluntary camp of 70 youths to find a solution for delinquency not in discipline from without, but in control from within. The workers at Hawkspur went all out to show the boy that though they could not always approve of what he did they always very much approved of him. The Q Camps Committee, which continues to work among evacuated children, started the camp in May, 1936. When in January, 1940, the war made it impossible for the camp to carry on it was still chronically short of funds and officially unrecognised. But it had the germ of a great idea and Mr. Wills tells an enthralling story of pioneer effort. The various forms of government adopted by the campers is in itself an instructive study of constitutional history. The work of diagnosing the members of the camp was carried out by a selection and treatment committee, mainly composed of medical psychologists—though Mr. Wills is careful to explain that he himself writes as a Christian and not as a psychologist—and the Institute for the Scientific Treatment of Delinquency gave a physical and psychometric examination as well as a psychiatric interview to each boy. Happiness is a human birthright and delinquents are among those who have not found it; Mr. Wills feels we should meet them not with retribution or punishment, but with treatment inspired by love.

CONTRACEPTIVE TECHNIQUE

WHATEVER his views on the ethics of contraception the doctor needs to be well informed about its practical aspects, for sooner or later he is sure to be called on to give advice on them. Many recently qualified men and women have been dismayed by their own ignorance when a patient asks for instruction on an efficient method of preventing conception. In the medical curriculum the subject is avoided, so that the young doctor is at a loss for theoretical data, and the patient's practical knowledge of the subject may be better than his own. What is the safest, most reliable, least distasteful and cheapest method of contraception? To answer these important questions Dickinson and Morris have produced a concise well-illustrated booklet.[1] All methods, good or bad, are reviewed; such dangerous devices as the Gräfenburg ring and the wishbone pessary are mentioned to be condemned. All gynæcologists recognise the dangers of infection and perforation from these two methods, which are not in any case certain preventives of conception since fœtus and ring have been seen occupying the same uterine cavity. The authors favour the condom for its simplicity, and the diaphragm pessary, but insist that both should be fortified by the concomitant use of a reliable spermicidal jelly. They do not advocate postcoital vaginal douching, since it is unreliable and must be used immediately if it is to confer even a minor degree of protection. They point out the dangers of using too strong a solution; most gynæcologists will recall cases of serious lysol or perchloride burns from this cause. There are short chapters on permanent sterilisation in the male and female, and an appendix on the organisation of a contraceptive clinic. The booklet will be useful to the man in practice and the final-year student.

VINEGAR AND CIRRHOSIS

A CORRESPONDENT tells us of his sister who died some years ago from cirrhosis of the liver which the hospital physician thought to be alcoholic. In fact the lady was almost a teetotaller, but she did take a great deal of vinegar, both poured over other food and as a drink. The correspondent suggests that the vinegar may have been the cause of the cirrhosis. The composition of vinegar varies, but apparently it may contain in addition to the main constituent, acetic acid, small quantities of formic and tartaric acids, free mineral acids combined sulphate, phosphates, caramel, sulphur dioxide and iron. The acetic acid is converted into acetates and these are quickly oxidised to carbonates and bicarbonates which do no more than alkalinise the urine. Some vinegars are fortified with sulphuric acid, but this should not be harmful in the doses likely to be taken. It does seem possible however that in large amounts vinegar may produce a chronic gastritis, and on one view of the ætiology of cirrhosis this would open the way for bacteria to reach the portal circulation and might lead to cirrhosis. The habit of drinking vinegar is much more common in women than in men, and some women take it as a slimming remedy. They may perhaps drink enough of it to produce a mild gastritis which robs them of their appetite. But the chapter is now closed, for slimming is out of fashion and vinegar is getting as scarce as whisky.

WEEK-END COURSE IN WAR MEDICINE.—A course in war medicine will be held at Shrewsbury Military Hospital on Oct. 25 and 26. Besides medical and surgical rounds the course will include lectures and demonstrations on eye injuries, gastroscopy, plastic ear nose and throat surgery, oxygen therapy for resuscitation and anæsthesia in the field.

MEDICAL CASUALTIES.—In recent casualty lists Colonel Cyril Popham, L.R.C.P.E., R.A.M.C., and W.S./Captain E. A. Robertson, M.B. Glasg., R.A.M.C., were posted as wounded. Lieutenant J. Campbell, M.B., R.A.M.C., is reported to be a prisoner of war.

Appointments

ALLISON, P. R., Ch.M. Leeds, F.R.C.S.: hon. surgeon to the thoracic-surgical department, Leeds General Infirmary.

FINE, WILFRED, M.B. Lond.: R.M.O. at Alcester Hospital, Warwickshire.

SHAND, G. E., M.D. Aberd., D.P.H.: temp. asst. M.O.H. for Portsmouth.

WATSON, H. B., M.B. Birm.: R.S.O. at Solihull Hospital, Warwickshire.

WILSON, JOHN, M.B. Leeds: R.S.O. at Grimsby and District Hospital.

1. Techniques of Contraception Control. By R. L. Dickinson, M.D., and W. E. Morris, M.D. Baltimore: The Williams and Wilkins Company. Pp. 56.

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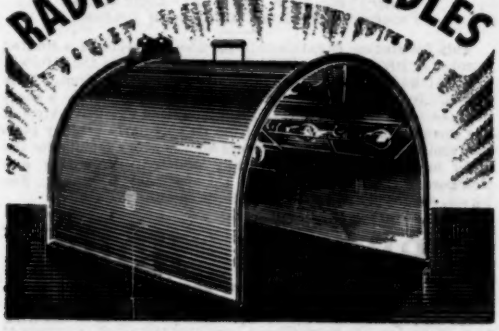

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WAR SURGERY OF THE CHEST

27th to 31st October, 1941

Monday, 27th Oct.	10 A.M.	Introductory Lecture ..	Mr. A. Tudor Edwards, M.S., F.R.C.S.
	11.30 A.M.	Anatomy, Physiology, and Pathology of Chest Wounds.	Mr. T. Holmes Sellors, D.M., M.Ch., F.R.C.S.
	2 P.M.	The Pathology of Wounds of the Chest.	Mr. O. S. Tubbs, F.R.C.S.
Tuesday, 28th Oct.	10 A.M.	The Surgery of the Open Thorax.	Mr. C. Price Thomas, F.R.C.S.
	11.15 A.M.	Anæsthesia in Chest Wounds.	Dr. H. Woodfield Davies, B.A., L.M.S.S.A.
	1.30 P.M.	Closed Wounds of Chest, &c.	Prof. J. A. Nixon, C.M.G., M.D., F.R.C.P.
	2.30 P.M.	Operative Demonstrations on the Cadaver.	Mr. A. K. Henry, M.Ch., F.R.C.S.
Wednesday, 29th Oct.	10 A.M.	Gunshot Wounds of the Heart.	Prof. G. Grey Turner, LL.D., D.Ch., M.S., F.R.C.S.
	11.15 A.M.	Radiography in Gunshot Wounds of the Chest.	Dr. J. Duncan White, M.B., Ch.B., D.M.R.E.
	2 P.M.	Thoracico-abdominal Wounds.	Surg. Rear-Admiral G. Gordon-Taylor, O.B.E., F.R.C.S.
	3.15 P.M.	Treatment of Wounds of the Chest Wall.	Mr. R. C. Brock, M.S., F.R.C.S.
Thursday, 30th Oct.	10 A.M.	Technique of Operations for Removal of Foreign Bodies from Lung; other Operations for Late Wounds.	Prof. G. Grey Turner, LL.D., D.Ch., M.S., F.R.C.S.
	11.15 A.M.	The Early Management and Nursing of Patients with Chest Wounds.	Mr. N. Barrett, M.Ch., F.R.C.S.
	2 P.M.	Operations on Cadaver, Mediastinum, Heart, &c.	Mr. A. K. Henry, M.Ch., F.R.C.S.
Friday, 31st Oct.	10 A.M.	Late Results of Gunshot Wounds.	Mr. J. E. H. Roberts, O.B.E., F.R.C.S.
	11.15 A.M.	Other Aspects of Closed Wounds of Chest.	Dr. A. J. Morland, F.R.C.P.
	2 P.M.	Miscellaneous Considerations regarding Chest Surgery, followed by a general discussion.	Mr. N. Barrett, M.Ch., F.R.C.S.

The fee for the Course is one guinea. Officers of the Armed Forces wishing to attend these lectures without payment of the fee should apply through their respective Director-Generals. Applications for tickets should be addressed to the DEAN, British Postgraduate Medical School, Ducane-road, W.12.

Further War Surgery courses will commence as follows:—

WAR SURGERY OF NERVOUS SYSTEM .. MONDAY, 10TH NOVEMBER.
OPERATIVE SURGERY IN WARTIME .. MONDAY, 24TH NOVEMBER.
WAR SURGERY OF THE EXTREMITIES .. MONDAY, 15TH DECEMBER.

L. M. S. S. A.

FINAL EXAMINATION: SURGERY, November 10th, December 8th, 1941, January 12th, 1942; MEDICINE, November 17th, December 15th, 1941, January 19th, 1942; MIDWIFERY, November 18th, December 16th, 1941, January 20th, 1942.

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NOTICE OF ANNUAL MEETING OF FELLOWS AND MEMBERS.

Notice is hereby given that it is proposed to hold a Meeting of Fellows and Members at the College in Lincoln's Inn-fields on THURSDAY, the 20TH NOVEMBER, 1941, at 2.30 o'clock P.M., and that a Report from the Council will be laid before the Meeting.

Fellows and Members can obtain copies of the Report on application to the Secretary, and can, if they so desire, have their names placed on the list of those to whom the Report is sent annually.

Motions to be brought forward at the Meeting must be signed by the mover, or by the mover and other Fellows and Members, and must be received by the Secretary not later than the 10th November.

A copy of the Agenda will be issued on or after the 15th November to any Fellow or Member who may apply for one.

9th October, 1941. KENNEDY CASSELS, Secretary.

Theodore Williams Medical Scholarship,

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Notice is hereby given that the next Examination for the Diploma in Anæsthetics will commence on MONDAY, NOVEMBER 17TH, 1941.

Candidates who have complied with the necessary requirements, and who desire to present themselves for the above Examination, must apply in writing to the Secretary, Examination Hall, 8–11, Queen-square, London, W.C.1, at least twenty-one days before the date of the Examination.

HORACE H. REW, Secretary.

Royal College of Surgeons of England.

DIPLOMA OF FELLOW.

Notice is hereby given that the next FINAL AND PRIMARY EXAMINATIONS for the Diploma of Fellow will commence on THURSDAY, NOVEMBER 13TH and MONDAY, DECEMBER 1ST respectively.

Candidates who have fulfilled the necessary conditions, and who desire to present themselves for examination, must give notice in writing to the Director of Examinations, Examination Hall, 8–11, Queen-square, London, W.C.1, at least twenty-one days before the date of the Examination, transmitting at the same time such certificates as may be required by the Regulations.

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Specially built and licensed for the care and treatment of a limited number of Ladies and Gentlemen suffering from NERVOUS and MENTAL breakdown. Voluntary and certified patients received. Ladies also admitted as Temporary Patients without certification. Terms moderate. *Apply,* RESIDENT PHYSICIAN, who may be seen in Liverpool, by appointment. *Tel. No.* 8 *Formby.*

CALDECOTE HALL

NUNEATON
WARWICKSHIRE
('Phone: Nuneaton 241)

Residential treatment of

"Nervous Disorders" & Alcoholism

(Certifiable cases are not received)

This beautiful mansion situated in the heart of the country (less than two hours from London by L.M.S.R.) and surrounded by charming pleasure grounds in which games and outdoor occupational therapy are available is devoted to the treatment of Alcoholism and "Nerves" by psychotherapeutic and ancillary methods.

Illustrated Brochure and particulars obtainable from A. B. CARVER, M.D., D.P.M., Resident Medical Superintendent.

TOR-NA-DEE SANATORIUM

Managing Director:
DAVID LAWSON, M.D., F.R.S.E.

FOR THE TREATMENT OF PULMONARY TUBERCULOSIS AND ALLIED DISEASES

Medical Superintendent: R. Y. KEERS, M.D.(Edin.)

For prospectus apply to The Secretary, Tor-na-Dee, Murtle, Aberdeenshire Telephone: Cults 107

THE COTSWOLD SANATORIUM

First opened in 1898 and rebuilt in 1925 on the Cotswold Hills seven miles from Cheltenham, for the Treatment of Pulmonary and all other forms of Tuberculosis. Aspect S.S.W., sheltered from North and East, elevation 800 feet. Pure bracing air, SPECIAL TREATMENT by artificial PNEUMOTHORAX (X-ray controlled). TUBERCULINS, and ULTRA-VIOLET RAYS is available when necessary without extra charge. X-RAY plant, Fully Equipped Dental Department, Electric Light Radiators, hot and cold basins and Wireless in all rooms. Up-to-date drainage. Full day & night Nursing Staff. Terms: 5½ to 9½ Guineas a week inclusive.

Med. Supt.: GEOFFREY A. HOFFMAN, B.A., M.B., T.C. Dub. *Asst. Phys.:* MARGARET A. HARRISON, M.B., B.S. Lond. *Cons. Laryngologist:* G. N. BARKER, F.R.C.S. Edin., D.L.O. *Cons. Dent. Surgeon:* GEORGE V. SAUNDERS, L.D.S.R.C.S. Lond. *Phone:* 81 & 82 Witcombe. Apply: *The Secretary, The Cotswold Sanatorium, Cranham, Gloucester. Telegrams:* "Hoffman, Birdlip."

CHEADLE ROYAL HOSPITAL, Cheadle, Cheshire.

This REGISTERED HOSPITAL, with a SEASIDE BRANCH at Colwyn Bay, N. Wales, is for the treatment and care of those of the Upper and Middle Classes suffering from MENTAL AND NERVOUS DISEASES.

The Hospital is governed by a COMMITTEE, appointed by the TRUSTEES of the Manchester Royal Infirmary.

In addition to the Main Buildings there are separate villas. Extensive grounds. Hard and grass tennis courts, cricket and croquet grounds, and a court for badminton. There are also wireless installations. Golf may be had within easy distance. Occupational Therapy.

VOLUNTARY, TEMPORARY, AND CERTIFIED PATIENTS received.

The Hospital is nine miles from Manchester, 50 minutes by rail from Liverpool, and 3½ hours from London.

For terms and further particulars apply to the Medical Superintendent, who may be seen in Manchester BY APPOINTMENT. *Telephone: Gatley* 2231 (3 lines).

COURT HALL, KENTON, near EXETER

FOR THE TREATMENT OF EIGHT LADIES, VOLUNTARY, TEMPORARY AND CERTIFIED PATIENTS

CLIFFDEN, TEIGNMOUTH

FOR EARLY AND CONVALESCENT CASES Recreational Therapies are held daily by skilled Leaders

The house stands high with spacious balconies and extensive views of the South Devon Coast. Beautiful garden. Own Dairy in 25 acres. Private road to beach. There is also a charming house, EBWORTHY, MANATON, DARTMOOR, situated in 20 acres, 1100 ft. up for bracing moorland air.

Resident Physicians—BERTHA M. MULES, M.D., B.S. ANNE S. MULES, M.R.C.S., L.R.C.P.

Telephones—STARCROSS 259 and TEIGNMOUTH 289

CAMBERWELL HOUSE, 33, Peckham Road, London, S.E.5

Telegrams: "PSYCHOLIA, LONDON." FOR THE TREATMENT OF MENTAL DISORDERS *Telephone:* RODNEY 4242 (2 lines)

Completely detached Villas for mild cases. Voluntary Patients received. Twenty acres of grounds; own garden produce. Hard and grass tennis courts, putting greens, Recreation Hall with Badminton Court, and all indoor amusements. Occupational therapy, Calisthenics, Actino-therapy, prolonged immersion baths, shock and also modified insulin treatment. Chapel.

Senior Physician, Dr. HUBERT JAMES NORMAN, assisted by a resident Medical Staff and visiting Consultants.

An Illustrated Prospectus giving fees, which are strictly moderate, may be obtained upon application to the Secretary.

The Convalescent Branch is HOVE VILLA, BRIGHTON, and is 200 ft. above sea-level.

THE OLD MANOR SALISBURY

A Private Hospital for the Care and Treatment of those of both sexes suffering from MENTAL DISORDERS.

Extensive grounds. Detached Villas. Chapel. Garden and Dairy Produce from own farm. Terms very moderate.
CONVALESCENT HOME AT BOURNEMOUTH Detached Villas standing in 12 acres of ornamental grounds, with tennis courts, etc., which Voluntary, Temporary or Certified Patients may visit by arrangement for long or short period.
Illustrated Brochure on application to the Medical Superintendent. The Old Manor, Salisbury. Telephone: Salisbury 3216 and 3217.

HAYDOCK LODGE,
NEWTON-LE-WILLOWS, LANCASHIRE.

For the reception and treatment of PRIVATE PATIENTS of both sexes of the UPPER AND MIDDLE CLASSES suffering from Mental and Nervous Disorders, Alcoholism and Drug addiction, either voluntarily, temporarily, or under certificate. Patients are classified in separate buildings according to their mental condition. Situated in park and grounds of 400 acres. Self-supported by its own farm and gardens in which patients are encouraged to occupy themselves. Every facility for indoor and outdoor recreation. For terms, prospectus, etc., apply MEDICAL SUPERINTENDENT. *'Phone:* Ashton-in-Makerfield 7311. *Tele. Address:* Street, Ashton-in-Makerfield.

PECKHAM HOUSE, 112, Peckham Road, London, S.E.15

Telegrams: "Alleviated, London" **Telephone: Rodney 2641-2642**

A Private Mental Hospital, for Ladies and Gentlemen suffering from Nervous and Mental Illness, where the amenities of a comfortable home are combined with full investigation and every well-established modern treatment.

Terms from 3½ guineas weekly.

Illustrated Prospectus may be obtained from the Physician Superintendent.

CRICHTON ROYAL, DUMFRIES
For NERVOUS AND MENTAL DISORDERS

Separate Villa for patients suffering from the effects of alcoholism and drug addiction. Every facility for complete investigation and individual treatment on the most modern lines. Fully equipped gymnasium, golf course, and indoor swimming pool. Specially trained occupational and recreational therapists. **Special Department for Insulin Therapy.** As the hospital is well endowed terms are exceptionally moderate, e.g., First Department from 3 guineas per week, Second Department, 2 and 2½ guineas per week. Voluntary and certified patients are received. Medical Certificates given anywhere in the British Isles are valid for admission of patients. *For prospectus, necessary forms, and further information apply to:—*
Physician Superintendent, P. K. McCowan, J.P., M.D. F.R.C.P., D.P.M., Barrister-at-Law. *Tel.* Dumfries 111.

CITY OF LONDON MENTAL HOSPITAL
Near DARTFORD, KENT.

Ladies and Gentlemen received for treatment under certificates, and without certificates as either VOLUNTARY or TEMPORARY PATIENTS, at a weekly fee of £2 9s., and upwards.

THE MAGHULL HOMES FOR EPILEPTICS (Inc.)
MAGHULL (near LIVERPOOL)

FARMING and OPEN AIR OCCUPATION for PATIENTS
A few vacancies in 1st and 2nd Class Houses.
FEES: 1st Class (men only) from £3 per week upwards. 2nd Class (men and women) 32/- per week.
For further particulars apply: **C. EDGAR GRISEWOOD, A.C.A., Secretary, 20, Exchange Street East, Liverpool, 2**

FENSTANTON, at "FIVE DIAMONDS," Chalfont St. Giles, Bucks.

A Private Home for the Care and Treatment of a limited number of LADIES with Mental and Nervous Disorders. Certified, Voluntary, and Temporary Patients received. Mansion with 12 acres of ground. (*See Medical Directory*, p. 2346.) Apply Resident Physician. Telephone: Little Chalfont 2046. Station: Chalfont and Latimer.

MALLING PLACE, KENT
For LADIES and GENTLEMEN of Unsound Mind.

Terms moderate. Apply to Resident Medical Superintendent. Telegrams: ADAM WEST MALLING. Telephone No. 2: MALLING.

Hampstead General Hospital,
Haverstock-hill, N.W.3.

Applications are invited from single medical Men or Women, together with R practitioners who now hold A posts, for the post of HOUSE PHYSICIAN (B2) for six months, vacant 1st November next, the post involving attendance also in the Casualty Department. Salary £133 6s. 8d. per annum, with board and lodging and laundry.

Applications on the prescribed form, with copies of three testimonials, to be returned by 24th October.

KENNETH A. F. MILES, House Governor and Secretary.

British Postgraduate Medical School.
(UNIVERSITY OF LONDON.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIANS and HOUSE SURGEONS (A), including R practitioners within three months of qualification. The appointment is for six months and carries a salary of £105 per annum, plus the usual residential emoluments.

Applications, stating age, qualifications with dates, and nationality, accompanied by copies of three recent testimonials, should be sent not later than Tuesday, 21st October, 1941, to the DEAN, British Postgraduate Medical School, Ducane-road, W.12.

British Postgraduate Medical School.
(UNIVERSITY OF LONDON.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT ANÆSTHETIST (B2), including R practitioners who now hold A posts. The appointment is for a period of six months. The salary is at the rate of £150 per annum, with the usual residential emoluments.

Applications, stating age, qualifications with dates, nationality, and previous experience, and accompanied by copies of three recent testimonials, should be sent to the DEAN, British Postgraduate Medical School, Ducane-road, W.12, not later than 28th October, 1941.

The Queen's Hospital for Children,
Hackney-road, E.2.

HOUSE SURGEON (B2) required 14th November, 1941. Six months' appointment. R practitioners now holding A posts are invited to apply. Salary (including certain additions) will amount to not less than £150 per annum, with board, lodging, and laundry. Candidates must be prepared to participate in the Hospital Service arrangements, in connexion with which beds have been reserved.

Applications must be made on form to be obtained from the undersigned and be sent in, with copies of not more than three testimonials, on or before 1st November, 1941.

CHARLES H. BESSELL, Secretary.

Royal Northern Hospital, Holloway,
N.7.

Applications are invited from registered medical practitioners, including R practitioners within three months of qualification, for the appointment of HOUSE SURGEON (A), to become vacant on 15th November for a period of six months. Salary and emoluments approximately £120 per annum, with board, residence, and laundry.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than 24th October.

GILBERT G. PANTER, Secretary.

London County Council.

TEMPORARY ASSISTANT DISTRICT MEDICAL OFFICERS required for :—

(a) Areas V and VI, District C (part of the Borough of Fulham). Provisional salary £87 10s. a year (including allowance for the use of surgery).
(b) Areas V and VI, District I (part of the Borough of Hammersmith). Provisional salary £260 a year.
(c) Area VII, District D (part of the Borough of Lambeth). Provisional salary £217 10s. a year (including allowance for the use of surgery).
(d) Area VII, District G (part of the Borough of Battersea). Provisional salary £265 a year.
(e) Area VII, District K (part of the Borough of Wandsworth). Provisional salary £207 10s. a year (including allowance for the use of surgery).
(f) Area VII, District M (part of the Borough of Wandsworth). Provisional salary £252 10s. a year (including allowance for the use of surgery).
(g) Area VII, District P (part of the Borough of Wandsworth). Provisional salary £77 10s. a year (including allowance for the use of surgery).
(h) Area VIII, District 1 (part of the Borough of Camberwell). Provisional salary £195 a year.

Persons engaged required to carry out duties prescribed by Public Assistance Order, 1930, and to reside in or near district. Remuneration and duties subject to review.

All vacancies, except in Area VIII (District 1), exist during the absence on war service of the appointed District Medical Officer.

Application form obtainable (stamped addressed foolscap envelope necessary) from MEDICAL OFFICER OF HEALTH, London County Council, Staff Division (S.D.6), 460, Seven Sisters-road, N.4, returnable by 10th November, 1941.

Canvassing disqualifies.

London County Council.

Medical practitioners required for the following positions (married quarters not available) : TEMPORARY ASSISTANT MEDICAL OFFICERS, Class I (B1). Salary, with board, lodging, and washing, £350–£25–£425. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply:

ST. ANDREW'S HOSPITAL, Devons-road, Bow, E.3—Anæsthetist.

ST. MARY, ISLINGTON, HOSPITAL, Highgate-hill, N.19—Obstetrician.

Application forms obtainable (stamped addressed foolscap envelope necessary) from MEDICAL OFFICER OF HEALTH, S.D.2, County Hall, S.E.1. Returnable by 3rd November, 1941. Canvassing disqualifies.

The Samaritan Free Hospital for WOMEN, Marylebone-road, N.W.1.

Applications are invited from registered medical practitioners (Male and Female), including R practitioners who now hold A posts, for the post of HOUSE SURGEON (B2) for a period of six months commencing 15th November next. Salary at the rate of £100 per annum, with board, lodging, and laundry. Previous experience as House Surgeon essential.

Applications, stating age, accompanied by copies only of testimonials, should be sent to the Secretary at the Hospital not later than NOON, Thursday, 30th October, 1941.

G. H. HAWKINS, Secretary.

Dreadnought Seamen's Hospital, GREENWICH.

Applications are invited from British Male registered medical practitioners for the appointment of HOUSE SURGEON (A), to become vacant 1st November, including R practitioners within three months of qualification when appointment will be for a period of six months. Salary is at the rate of £120 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and accompanied by copies of three recent testimonials, should be sent immediately to the undersigned.

F. A. LYON, Secretary.
Seamen's Hospital Society, Greenwich, S.E.10.

Preston and County of Lancaster ROYAL INFIRMARY.

Applications are invited from registered medical practitioners for the post of HOUSE SURGEON (A) to the EYE AND EAR, NOSE, AND THROAT DEPARTMENT. R practitioners within three months of qualification may apply, when appointment will be for a period of six months. Salary at the rate of £150 per annum, with the usual residential allowances.

Applications, stating age and qualifications with dates, and nationality, and accompanied by copy testimonials, should be sent to Mr. JOHN GIBSON, Superintendent and Secretary.

St. Paul's Eye Hospital, Liverpool.

Applications are invited from registered medical practitioners, Male or Female, including R practitioners who now hold A posts, for the post of RESIDENT HOUSE SURGEON (B2). Six months' appointment. Salary £160 per annum, with board, &c.

Applications, stating age, qualifications, and nationality, accompanied by copies of three recent testimonials, should be sent to the SECRETARY by 25th October, 1941.

Borough of Tottenham

APPOINTMENT OF DEPUTY MEDICAL OFFICER OF HEALTH.

Applications are invited, under the provisions of Section 115 of the Local Government Act, 1935, from duly qualified medical practitioners who must be registered in the Medical Register as holders of a Diploma in Sanitary Science, Public Health, or State Medicine, for the position of Deputy Medical Officer of Health for the Borough.

The commencing salary will be at the rate of £750 per annum, rising by annual increments of £25 to a salary at the rate of £900 per annum (plus current war bonus of 6 per cent. on the first £300 and 3 per cent. on the next £200). The appointment will be subject to the provisions of the Local Government Superannuation Acts and to the passing of a medical examination.

Candidates will be required to undertake, under the direction of the Medical Officer of Health, clinical and administrative duties in all branches of Public Health work, including the School Medical Service, Maternity and Child Welfare, and Air Raid Precautions.

Forms upon which application must be made may be obtained from Dr. G. Hamilton Hogben, Medical Officer of Health, Public Health Department, Town Hall, Tottenham, N.15, and should be returned, together with copies of three recent testimonials, to the undersigned not later than Thursday, 23rd October, 1941, in an envelope marked "Appointment of Deputy Medical Officer of Health."

E. TOWNSON, Town Clerk.
Town Hall, Tottenham, N.15, 1st October, 1941.

The Hostel of St. Luke, 14, Fitzroy-square, W.1.

Applications are invited from Male medical practitioners for the post of VISITING MEDICAL OFFICER at a salary of £150 per annum. The duties will include a daily visit to the patients in the Hostel, assistance at operations, and emergency visits as required. Applicants should reside within a reasonable distance of the Hostel.

Applications, with copies of testimonials if desired, should be sent to the undersigned on or before Tuesday, 21st October. Selected candidates will be asked to attend a meeting of the Medical Committee and will be duly informed of the time and date.

Surgeon Captain J. A. L. CAMPBELL, O.B.E., R.N. (ret.).

Huddersfield Royal Infirmary. (321 Beds.)

Male HOUSE SURGEON (A) required to be attached to EYE, EAR, NOSE AND THROAT DEPARTMENTS. Duties to commence on 19th November, 1941, and will include the administration of anæsthetics. R practitioners within three months of qualification may apply. Salary £150 per annum, with board, residence, and laundry. Appointment for six months, subject to renewal for a similar period. If held by an R practitioner, the appointment will be for a period of six months.

Applications, with copies of three recent testimonials, to be addressed to the undersigned.

H. J. JOHNSON, General Superintendent and Secretary.

Royal Manchester Children's Hospital, PENDLEBURY, near MANCHESTER.

RESIDENT SURGICAL OFFICER (B1 Appointment).

Applications are invited for the post of Resident Surgical Officer. Salary £150 per annum. The appointment is for a period of six months commencing 1st December, 1941. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply.

Applications, stating age and accompanied by copies of not more than three recent testimonials, to be sent to the undersigned immediately. Canvassing, directly or indirectly, may disqualify.

By Order.
H. HEARDMAN, General Superintendent and Secretary.

Liverpool Eye, Ear and Throat INFIRMARY, Myrtle-street, LIVERPOOL, 7.

Applications are invited for the post of AURAL HOUSE SURGEON (A) to commence duties immediately. The appointment is tenable for six months, subject to renewal. Applicants must be duly qualified and registered and members of the Medical Defence Union. R practitioners within three months of qualification may apply, when the appointment will be for a period of six months. Salary £120 per annum.

Applications, stating age, qualifications, and experience, together with copies of not more than three recent testimonials, should be sent immediately to the undersigned.

WM. LEAR, Secretary.

Leicester Royal Infirmary.

OBSTETRIC HOUSE SURGEON.
VACANCY 1ST DECEMBER, 1941.

Applications are invited for the post of Obstetric House Surgeon (Female) to the MATERNITY HOSPITAL, CAUSEWAY-LANE (52 Beds), recently taken over by the Leicester Royal Infirmary. The appointment is for six months, remuneration at the rate of £150 per annum.

Applications, with copies of testimonials, to be forwarded to the HOUSE GOVERNOR AND SECRETARY at the Infirmary on or before the 27th October, 1941.

13th October, 1941.

HIS MAJESTY'S COLONIAL SERVICE

THE COLONIAL MEDICAL SERVICE

VACANCIES FOR MEDICAL OFFICERS

The maintenance of an efficient Colonial Medical Service constitutes a vital part of the national war effort and it is most important that the Service should be assured of an adequate supply of doctors.

The Secretary of State for the Colonies therefore invites applications from doctors possessing a medical qualification registrable n the United Kingdom who are British subjects and who are under thirty-five years of age.

Medical Officers are appointed in the first instance for general service. But there are ample opportunities for work in special branches of medicine and surgery, in public health and in medical research.

The normal salary scale is from £600 to between £1,000 and £1,120. There are large numbers of super-scale posts to which promotion is made on merit and which carry higher salaries.

Government quarters, in many cases free of rent, and first-class passages to and from the Colonies are provided, and an adequate pension scheme is in force.

Selected candidates are normally required to attend a course of instruction in Tropical Medicine and Hygiene either before proceeding overseas or during their first period of leave.

Further particulars, including the regulations governing admission to the Colonial Medical Service, may be obtained from the Director of Recruitment (Colonial Service), 2, Park-street, London, W.1.

County Borough of Middlesbrough.

HEALTH DEPARTMENT.

HEMLINGTON HOSPITAL.

Applications are invited for the appointment of RESIDENT SURGICAL OFFICER (B1) at the above Hospital, at a salary of £550 per annum, plus usual residential emoluments. Suitably qualified R practitioners holding B2 or B1 posts may apply.

The successful candidate may, at the Council's discretion, be required to live outside the Hospital, in which case £100 per annum will be payable in lieu of the residential emoluments.

The candidate must have had wide surgical experience. He will be generally responsible to the Medical Officer of Health.

The successful candidate will be required to pass satisfactorily a medical examination.

Applications, accompanied by copies of three recent testimonials, to be sent immediately to the Medical Officer of Health, Health Department, Municipal Buildings, Middlesbrough.

PRESTON KITCHEN, Town Clerk.

Municipal Buildings, Middlesbrough, 10th October, 1941.

Royal Surrey County Hospital.

(475 Beds.)

Applications are invited from registered medical practitioners, including R practitioners within three months of qualification, for the appointment of CASUALTY OFFICER (A), vacant on 1st November. The appointment is for six months. Salary £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and copies of not more than three testimonials, to reach the SECRETARY-SUPERINTENDENT by the 24th October.

Salford Royal Hospital.

Applications are invited from registered medical practitioners, Male and Female, including R practitioners within three months of qualification, for the following appointment: CASUALTY HOUSE SURGEON (A), which will become vacant on 1st November, 1941. Salary at the rate of £125 per annum, with full residential emoluments. The appointment is normally for six months.

Applications, on the prescribed form, should be sent at once to the undersigned, from whom further particulars and form of application are obtainable.

H. B. SHELSWELL, General Superintendent and Secretary.

10th October, 1941.

Salford Royal Hospital.

APPOINTMENT OF ASSISTANT RESIDENT SURGICAL OFFICER AND SENIOR CASUALTY OFFICER (B1).

Applications are invited from registered medical practitioners for the above appointment. Duties will commence on 20th October. Applicants should have held house appointments and had surgical experience. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. Salary £200 per annum, plus the usual residential emoluments. The appointment is for twelve months and is renewable.

Applications should be made upon a special form obtainable from the undersigned.

H. B. SHELSWELL, General Superintendent and Secretary.

15th September, 1941.

King Edward VII Hospital, Windsor.

Applications are invited from registered medical practitioners, including R practitioners within three months of qualification when appointment will be for a period of six months, for the appointment of a JUNIOR CASUALTY OFFICER (A). The salary is at the rate of £120 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, together with copies of three recent testimonials, should be sent to the undersigned by 25th October, 1941.

GEORGE WESTON, Secretary.

Royal Buckinghamshire Hospital,

AYLESBURY. (150 Bed—3 Resident.)

Applications are invited from Male and Female registered medical practitioners for the following posts, to commence 1st January, 1942: HOUSE SURGEON, salary £120 per annum; HOUSE PHYSICIAN, salary £120 per annum. Both are A posts, and applicants may be R practitioners within three months of qualification, when appointments will each be for a period of six months. Full board, residence, and laundry are provided in each case. Opportunity is afforded to work with London Consultant and to undertake duties according to the post held in all branches of medical and surgical practice, including anæsthetics.

Applications, stating age qualifications with dates, nationality, together with copies of two recent testimonials, to be sent to the undersigned not later than 31st October, 1941. Selected candidates will be required to attend for interview by the Medical Committee on Friday, 7th November, 1941.

F. G. DAWES, Secretary-Superintendent.

Chelmsford and Essex Hospital,

London-road, CHELMSFORD, ESSEX.

(235 Beds.)

Applications are invited for the post of CASUALTY OFFICER AND RESIDENT ANÆSTHETIST (A), Male of Female. R practitioners within three months of qualification may apply when appointment will be for a period of six months. Salary £150 per annum, plus board, lodging, and laundry.

Apply, with recent testimonials, to the undersigned immediately. R. G. MORRISH, House Governor and Secretary.

Royal Salop Infirmary, Shrewsbury.

(268 Beds.)

APPOINTMENT OF RESIDENT HOUSE SURGEON (B2).

Applications are invited from registered medical practitioners, Male or Female, for the appointment of Resident House Surgeon (B2), to become vacant on 1st November, including R practitioners who now hold A posts. The appointment is for a period of six months. Salary is at the rate of £160 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

J. W. NOBLE, Secretary-Superintendent.

Board Room, 14th October, 1941.

Royal Salop Infirmary, Shrewsbury.

(268 Beds.)

APPOINTMENT OF RESIDENT SURGICAL OFFICER (B1).

Applications are invited from registered medical practitioners for the appointment of Resident Surgical Officer to become vacant on November 7th. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding Diploma of F.R.C.S. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. Salary is at the rate of £250 per annum, with full residential emoluments.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

J. W. NOBLE, Secretary-Superintendent.

Board Room, 14th October, 1941.

Ancoats Hospital, Manchester, 4.

HOUSE SURGEON (Orthopædic) required (A appointment), Male or Female. Appointment for six months. Salary £100 per annum, with 10 per cent. bonus, board, lodging, laundry, &c. R practitioners within three months of qualification may apply.

Apply, stating age, qualifications, experience, if any, together with copies of three recent testimonials, on or before 29th October.

HERBERT J. DAFFORNE,

General Superintendent and Secretary.

Administrative County of Essex.

ESSEX COUNTY HOSPITAL, BROOMFIELD.

APPOINTMENT OF JUNIOR RESIDENT MEDICAL OFFICER (B2).

The County Council of the Administrative County of Essex invite applications from registered medical practitioners for the vacant appointment at the Essex County Hospital, Broomfield, which contains 300 Beds for the treatment of pulmonary and surgical tuberculosis in men.

Applicants may include suitably qualified R practitioners who hold A posts. The appointment would normally be for a period of one year, but if the successful applicant is an R practitioner, the appointment will be limited to six months. Salary £250 per annum, together with the usual indoor emoluments valued at £160 per annum.

The successful applicant will be required to pass a medical examination, and the appointment will be subject to the Council's Sick Pay Rules and Regulations, a copy of which will be forwarded upon application.

Applications on the prescribed form, obtainable from the undersigned, should be addressed to me, in an envelope marked "Appointment of Junior Resident Medical Officer" and delivered at the County Hall, Chelmsford, not later than 9 A.M. on Saturday, the 1st day of November, 1941.

JOHN E. LIGHTBURN, Clerk of the County Council.

County Hall, Chelmsford, 7th October, 1941.

Coventry and Warwickshire Hospital.

APPOINTMENT OF RESIDENT SURGICAL OFFICER (B1).

Applications are invited from registered medical practitioners for the appointment of Resident Surgical Officer. Applicants must have held house appointments and had surgical experience. Preference will be given to candidates holding the diploma of F.R.C.S. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. Salary at the rate of £350 per annum, with full residential emoluments.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of not more than three recent testimonials, should be addressed to the HOUSE GOVERNOR, Coventry and Warwickshire Hospital, Coventry.

County Borough of Walsall.

TEMPORARY ASSISTANT MEDICAL OFFICER OF HEALTH.

Applications are invited for the post of Temporary Assistant Medical Officer of Health (Male or Female). Salary £600 per annum. Applicants must be registered medical practitioners, and preference will be given to one possessing a Diploma in Public Health.

The officer appointed will be required to take part in the general public health work of the Borough, including Maternity and Child Welfare, School Medical work, and Infectious Diseases.

Statement of duties and terms and conditions of appointment and form of application may be obtained from the undersigned.

Applications should be sent to me not later than 25th October, 1941. Envelopes to be marked outside "Application Asst. M.O.H."

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937.

W. STALEY BROOKES, Town Clerk.

Council House, Walsall, 10th October, 1941.

Berkshire Mental Hospital, Wallingford.

Applications are invited for the post of THIRD ASSISTANT MEDICAL OFFICER (B1) at the above Hospital. Commencing salary £390 per annum, plus war bonus of £20 14s. together with board, furnished apartments, and laundry valued at £90 per annum. An additional amount of £50 per annum is payable if in possession of the D.P.M. Suitably qualified R practitioners holding B2 or B1 posts may apply.

Applications in writing, together with copies of three testimonials, should reach the MEDICAL SUPERINTENDENT not later than first post on Saturday, 25th October, 1941.

Royal South Hants and Southampton

HOSPITAL, SOUTHAMPTON.

(255 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT ANÆSTHETIST (B2) to become vacant on 12th November, 1941, including R practitioners who now hold A posts. The appointment will be for a period of six months. The salary is at the rate of £175 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

E. L. WIRGMAN, House Governor.

Victoria Hospital, Accrington.

APPOINTMENT OF HOUSE SURGEON (A).

Applications are invited from registered medical practitioners, Male, for the appointment of HOUSE SURGEON (A) to become vacant 1st November, including R practitioners within three months of qualification, when appointment will be for a period of six months. Salary is at the rate of £175 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by three recent testimonials, should be sent to the undersigned immediately.

W. H. WARBURST, LL.B., Hon. Secretary.

Huntingdonshire County Council.

PUBLIC HEALTH DEPARTMENT.

Applications are invited from registered medical practitioners (Female) for the post of HOUSE SURGEON at PAXTON PARK MATERNITY HOME, in the County of Huntingdon. Candidates must have had previous midwifery experience. The salary will be at the rate of £200 per annum, with full board, lodging, and laundry.

Applications, stating age, nationality, qualifications, and experience, and accompanied by copies of not more than two recent testimonials, should be sent to the undersigned at once.

C. B. MOSS-BLUNDELL, County Medical Officer.

County Offices, Gazeley House, Huntingdon.

Royal Hampshire County Hospital,

WINCHESTER. (461 Beds.)

Applications are invited from registered medical practitioners, including R practitioners within three months of qualification, for the appointment of HOUSE PHYSICIAN (A). The appointment will be for a period of six months. Salary is at the rate of £175 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

H. EWART MITCHELL, Superintendent and Secretary.

Applications are invited for the

post of OUT-PATIENTS' MEDICAL OFFICER. Successful candidates will be required to undertake morning work in the Out-patient Department. Applicants must be registered medical practitioners and possess a good knowledge of refraction work. Salary £200 per annum, six mornings per week.

Applications, giving qualifications and age, accompanied by three recent testimonials, should be sent to the GENERAL SUPERINTENDENT AND SECRETARY, MANCHESTER ROYAL EYE HOSPITAL.

Royal Sheffield Infirmary and Hospital.

THE ROYAL INFIRMARY, SHEFFIELD, 6.

Applications are invited from registered medical practitioners (Male and Female) for the following A appointments: HOUSE SURGEON, HOUSE PHYSICIAN, ASSISTANT CASUALTY OFFICER, to become vacant on 1st November, including R practitioners within three months of qualification. The appointments will be tenable for six months. Salary is at the rate of £80 per annum, with full residential emoluments, and a bonus of £20 payable at the expiration of six months' satisfactory service.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned forthwith.

H. KINGSLEY PEARCE,

4th October, 1941. General Superintendent and Secretary.

Staffordshire County Council.

WORDSLEY HOSPITAL, NEAR STOURBRIDGE.

(Total Beds, 900.)

APPOINTMENT OF RESIDENT MEDICAL OFFICER (B1).

Applications are invited from non-alien registered medical practitioners for the above-mentioned appointment, which, in the first instance, will be for 12 months, and will be subject to 3 months' notice on either side. Applicants should have held house appointments, with surgical experience, and suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. Salary at the rate of £350 per annum, together with full residential emoluments.

Applications, with copies of three recent testimonials, must reach the undersigned not later than the 23rd of October, 1941.

H. L. UNDERWOOD, Clerk of the County Council.

County Buildings, Stafford, 6th October, 1941.

Royal Isle of Wight County Hospital,

RYDE.

APPOINTMENT OF A HOUSE SURGEON (B2).

Applications are invited from registered medical practitioners, Female, for the appointment of a House Surgeon (B2) which became vacant on 1st October. The appointment will be for six months. Salary at the rate of £180 a year, with board, residence, and laundry. As this is the senior post, previous surgical experience is advisable.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned without delay.

A. S. GORDON, Secretary.

University of Oxford.

NUFFIELD DEPARTMENT OF OBSTETRICS AND GYNÆCOLOGY.

Applications are invited for the post of ASSISTANT in the above Department, to start on 1st January, 1942. The work is in the Radcliffe Hospital, Oxford, and duties are full time. The candidate must be a Member of the Royal College of Obstetricians and Gynæcologists, or be prepared to sit the necessary examination at an early date. Minimum salary £300 per annum.

Applications, addressed to the SECRETARY of the Department at the Radcliffe Infirmary, should be received before 25th October.

County Borough of Stockport.

PUBLIC HEALTH AND ASSISTANCE COMMITTEE.

LADY ASSISTANT MEDICAL OFFICER.

Applications are invited from duly qualified medical Women for the position of Assistant Medical Officer for Maternity and Child Welfare.

The officer appointed will be required to assist the Medical Officer of Health in carrying out the Council's Maternity and Child Welfare Scheme and such other duties from time to time as directed by the Council. She will be required to devote her whole time to the service of the Council.

Applicants must be registered medical practitioners and possess the Diploma of Public Health or similar qualification. Preference will be given to candidates who have had experience in diseases of women and children and in maternity and child welfare work.

The salary will be at the rate of £600 per annum inclusive, rising by annual increments of £25 to a maximum of £700 per annum inclusive, plus (at the present time) an increased cost-of-living bonus of £24 on the commencing salary.

The candidate appointed will be required to pass a medical examination and will be subject to the provisions of the Local Government Superannuation Act, 1937.

Forms of application, and particulars as to the terms and conditions of the appointment, may be obtained from the Medical Officer of Health, Town Hall, Stockport.

Canvassing, directly or indirectly, will be a disqualification.

Applications, accompanied by copies of three recent testimonials and endorsed "Assistant Medical Officer," should reach the undersigned not later than the first post on Monday, 3rd November, 1941. F. KNOWLES, Town Clerk.

Town Hall, Stockport, October, 1941.

Cardiff Royal Infirmary.

Applications are invited for the post of HONORARY SURGEON in charge of the Fracture Clinic at the above Institution. This appointment will be governed by the established rule for war-time appointments as put forward by the *British Medical Journal* and approved by the Council of the Cardiff Royal Infirmary, viz.:—

No new appointments to the consultant and specialist staffs of municipal and voluntary hospitals should be made on a permanent basis during the period of war and for a period of twelve months thereafter. Where it is necessary to make an appointment, it should be temporary and terminable within twelve months of the conclusion of hostilities.

Applicants should be Masters of Surgery in one of the Universities of the United Kingdom or Fellows of one of the Royal Colleges of Surgeons in the United Kingdom, and shall confine themselves in their practice to their specialty.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be sent not later than 17th November to the undersigned, from whom further information regarding the duties attached to the post may be obtained, as well as the form of application.

R. ARMSTRONG, Medical Superintendent.

10th October, 1941.

The Radcliffe Infirmary, Oxford.

Applications are invited from registered medical practitioners, Male and Female, for the following appointments to become vacant on the 1st December, 1941:—

One CASUALTY OFFICER (B2)—including R practitioners now holding A posts.

One CASUALTY OFFICER (A) } including R practitioners
One HOUSE SURGEON (A) } within three months of qualification.

Appointments will be for a period of six months. The salary is at the rate of £100 per annum, with full residential emoluments. All resident medical officers will have some anæsthetic duties to perform.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three testimonials, should be sent to the undersigned not later than Monday, 3rd November, 1941.

October, 1941. A. G. E. SANCTUARY, Administrator.

East Sussex County Council.

SOUTHLANDS HOSPITAL, SHOREHAM-BY-SEA, SUSSEX.

APPOINTMENT OF RESIDENT ASSISTANT MEDICAL OFFICER (B1).

Applications are invited from registered medical practitioners for the appointment of Resident Assistant Medical Officer. Applicants should have held house appointments and have had chiefly obstetrical but also general medical and anæsthetic experience. Suitably qualified R practitioners holding B2 or B1 appointments and women practitioners of similar status are invited to apply. Salary is at the rate of £400 per annum, with board, lodging, and laundry (or allowance in lieu thereof). The post is superannuable, the appointment will be determinable by one month's notice on either side, and will be subject to such conditions of service as may from time to time be approved on behalf of the County Council. The selected candidate will be required to pass a medical examination.

Applications, stating age, nationality, qualifications with dates, experience, and previous appointments, and accompanied by copies of three recent testimonials, should be sent to the Medical Superintendent not later than 28th October, 1941.

H. S. MARTIN, Clerk of the Council.

City of Manchester.

CRUMPSALL HOSPITAL. (1400 Beds.)
(Recognised under the Regulations for the F.R.C.S.)

APPOINTMENT OF RESIDENT ASSISTANT MEDICAL OFFICER (A).

Applications are invited from registered medical practitioners, Male and Female, for the above appointment which will become vacant on 8th November, 1941, including R practitioners within three months of qualification when the appointment will be for a period of six months. Otherwise it will be for a period of twelve months. The duties of the post are mainly the administration of anæsthetics, but the holder of the post may be called upon to undertake certain medical and surgical duties.

The basic salary for the appointment is £200 per annum, or if held by an R practitioner as above £125 per annum, with board, residence, and laundry in addition. A temporary cost-of-living wages award is payable in addition to the foregoing salaries. The appointment is subject to the Manchester Corporation conditions of service.

Full information and forms of application may be obtained from the Medical Officer of Health, Hospitals Administration Section, P.O. Box 399, Town Hall, Manchester, 2, and applications for the post must be received by him not later than 29th October, 1941.

Canvassing in any form is prohibited.

R. H. ADCOCK, Town Clerk.

Town Hall, Manchester, 2, 11th October, 1941.

City and County of Newcastle upon TYNE.

NEWCASTLE GENERAL HOSPITAL. (900 Beds.)

APPOINTMENT OF HOUSE PHYSICIANS (A) AND HOUSE SURGEONS (A).

Applications are invited from registered medical practitioners for the above appointments, including R practitioners within three months of qualification. The appointments will be tenable for a period of six months. Salary £150 per annum, together with the usual residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of two recent testimonials, should be forwarded immediately to the MEDICAL OFFICER OF HEALTH, Health Department, Town Hall, Newcastle upon Tyne, 1.

Owing to the fact that the permitted establishment of refugee practitioners at the Hospital is already complete, it is regretted that applications for above appointments from refugee practitioners cannot be considered.

Worcestershire County Council.

THE ALL SAINTS' HOSPITAL, BROMSGROVE.
(550 Beds.)

APPOINTMENT OF HOUSE PHYSICIAN (A).

Applications are invited from registered medical practitioners (preferably Male) for the above appointment which will become vacant in November, 1941, including R practitioners within three months of qualification. The appointment will be for six months. Salary is at the rate of £120 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the Medical Superintendent, The All Saints' Hospital, All Saints'-road, Bromsgrove, forthwith.

C. H. BIRD, Clerk of the County Council.

Shirehall, Worcester, 6th October, 1941.

City and County of Bristol.

DEPARTMENT OF PUBLIC HEALTH.

HAM GREEN HOSPITAL AND SANATORIUM.

APPOINTMENT OF ASSISTANT RESIDENT MEDICAL OFFICERS (B2).

Applications are invited from registered medical practitioners for the appointment of Two Assistant Resident Medical Officers for a minimum period of six months. Applicants should have held house appointments. Applicants can include R practitioners who now hold A posts when appointment will be limited to six months. Salary is at the rate of £200 per annum, with full residential emoluments. The Hospital has the following Beds—340 Fever, 160 Tuberculosis.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than the 27th October, 1941.

R. H. PARRY, Medical Officer of Health.

Kenwith Lodge, Westbury Park, Bristol, 6.

Hull Royal Infirmary.

Applications are invited from registered medical practitioners (Male), including R practitioners within three months of qualification when appointment will be for a period of six months, for the post of CASUALTY OFFICER (A), vacant now. Salary at the rate of £175 (plus £25 war bonus) per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of recent testimonials, should be sent to the undersigned.

R. J. CARLESS, House Governor.

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City of Liverpool.

ALDER HEY CHILDREN'S HOSPITAL.

APPOINTMENT OF RESIDENT ASSISTANT MEDICAL OFFICER (B2).

Applications are invited from registered medical practitioners (Male and Female), including R practitioners who now hold A posts, for the appointment of Resident Assistant Medical Officer (B2) at the above Hospital.

Preference will be given to candidates with experience in children's diseases. If held by an R practitioner the appointment will be limited to six months, otherwise it will be for a period of twelve months. The salary is at the rate of £200 per annum, with full residential allowances. All fees received in connexion with the appointment to be handed over to the City Council. The appointment will be made in accordance with the Standing Orders of the City Council and will be determinable by one month's notice on either side.

Applications, stating whether R practitioner, age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be endorsed "Resident Medical Officer" and sent to the undersigned not later than 10 A.M. on Saturday, 25th October, 1941. W. H. BAINES, Town Clerk.

Municipal Buildings, Dale-street, Liverpool, 2,
October, 1941.

Rhondda Urban District Council.

ASSISTANT MEDICAL OFFICER.

Applications are invited from registered medical practitioners of either sex for appointment as Assistant Medical Officer, under the supervision of the Council's Medical Officer of Health and School Medical Officer, at a salary of £500, rising by annual increments of £25 to £700 per annum, plus war bonus which at present amounts to £24 per annum on the commencing salary.

Forms of application and conditions of appointment may be obtained from the Medical Officer of Health, Tydfil House, Pentre, Rhondda, by whom completed applications must be received not later than Thursday, the 30th October, 1941.

D. J. JONES, Clerk of the Council.

Council Offices, Pentre, Rhondda, 9th October, 1941.

North Staffordshire Royal Infirmary,

STOKE-ON-TRENT. (472 Beds.)

Applications are invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1), now vacant. Suitably qualified R practitioners holding B1 or B2 appointments are invited to apply. The Fellowship of one of the Royal Colleges of Surgeons is desirable. Salary is at the rate of £350 per annum, with board, residence, and laundry, and the post is tenable for a period of twelve months.

Applications, stating age, nationality, qualifications, accompanied by three copy testimonials, should be sent to the undersigned by Friday, 31st October.

THORNBURROW GIBSON, Secretary and House Governor.

North Staffordshire Royal Infirmary,

STOKE-ON-TRENT. (472 Beds.)

Applications are invited from registered medical practitioners, including R practitioners who now hold A posts, for the post of ORTHOPÆDIC HOUSE SURGEON (B2). Previous orthopædic experience is desirable for this post, which is tenable for six months. The Orthopædic Department serves one of the largest fracture clinics in the country and offers exceptional experience. Salary is at the rate of £150–£200 per annum, according to experience, with board, residence, and laundry.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three recent testimonials, should be sent to the undersigned as soon as possible.

THORNBURROW GIBSON, Secretary and House Governor.

The Staffordshire General Infirmary,

STAFFORD.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE PHYSICIAN (A) to commence duties immediately, including R practitioners within three months of qualification. The appointment will be for six months. Salary £150 per annum, with board-residence.

Applications, stating age, qualifications, and experience, accompanied by copies of three recent testimonials, should be sent to me forthwith.

Stafford, 10th October, 1941. A. E. COLLINS, Secretary.

Southend-on-Sea General Hospital.

Applications are invited from registered medical practitioners, Male, including R practitioners who now hold A posts, for the following appointment (six months): SENIOR HOUSE SURGEON (B2). Duties to commence on or about 24th November. Salary at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and accompanied by copies of three recent testimonials, to be sent to the undersigned not later than 1st November.

P. H. CONSTABLE, House Governor and Secretary.

The Royal Hospital, Wolverhampton.

(Incorporated under Royal Charter.)
(310 Beds.)

Applications are invited from registered medical practitioners, including R practitioners within three months of qualification, for the following post: HOUSE SURGEON (GENERAL SURGERY) (A), vacant now. Salary at the rate of £100 per annum, with full residential emoluments. The appointment is for six months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

13th October, 1941. W. H. HARPER, House Governor.

Glasgow Royal Mental Hospital.

SENIOR ASSISTANT PHYSICIAN (B1) wanted for the duration of the war for the Glasgow Royal Mental Hospital. Suitably qualified R practitioners holding B2 or B1 posts may apply, with approval of the Scottish Central Medical War Committee. Particulars of the appointment can be obtained from the PHYSICIAN-SUPERINTENDENT, to whom applications should be addressed. Salary £500 per annum, with full board, lodging, and laundry.

Ministry of Pensions.

Applications are invited from registered medical practitioners, including suitably qualified R practitioners holding B2 or B1 posts, for the post of RADIOLOGIST (B1), vacant on 1st November, at the Ministry's Hospital at Newquay. Applicants must hold a Diploma in Radiology. The salary will be £450 per annum. Free board and lodging will be provided, or £100 per annum in lieu thereof.

Applications, stating age, nationality, qualifications with dates, and experience, accompanied by copies of three recent testimonials, should be sent to the SECRETARY (Establishments), Ministry of Pensions, Norcross, Blackpool, Lancs.

Canvassing through Members of Parliament or in other ways will render a candidate liable to disqualification.

Applications invited for position of

Full-time MEDICAL OFFICER in large Factory in Midlands, approximately 10,000 workers, male and female. Permanent well-paid position shortly falling vacant. Some knowledge of factory legislation and routine desirable.—Address, No 822, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

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